

September 1988

The National Locksmith®



Safe Issue

The National Locksmith • September 1988 • Volume 59, Number 9

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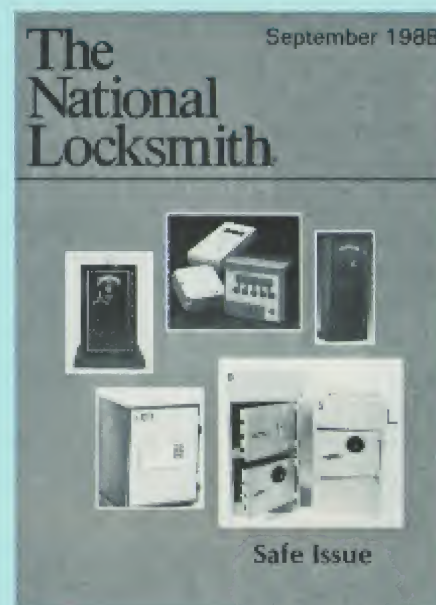
This article described the procedures by which you can derive the combination of a Simplex lock.

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Management wizard Sean DeForrest continues his series with this article centering on how you can use education as your greatest tool.

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Here is the continuation of a code series started last month. Save these codes for future reference.



On The Cover

Featured on this month's cover are safe products from the following companies: (clockwise from upper left) National Security Safe Co.; Sargent & Greenleaf's Electronic Time Lock; Fort Knox Security Products; Pacific Security Products; and LSDA.

*Click on the article
you wish to read*

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Commentary

Fun Facts For September

Have you given any thoughts to safes lately? Since this is our Safe Issue I think it's a good time to remind you that safes are a high ticket and very saleable product which can help add to your bottom line. Not only should you upgrade your inventory to include safes, but you also can gain expertise in the area of safe servicing as well.

There are numbers of safe service courses available to you around the country. These will teach you everything from combination changing to manipulation and penetration. Of course, *The National Locksmith* also offers books on safe service which will help you take part in this profitable area of locksmithing.

Here is some interesting information on new vehicles to be introduced shortly as part of the 1989 model year. The Chevrolet division of G.M. has formed a new division to be called "Geo." This new division will market vehicles imported exclusively by or built for Chevy. They will be sold by Chevrolet dealers as domestic brand vehicles.

The first vehicle to be introduced by Geo will be the Geo Tracker. The Tracker is a clone of the new Sidekick by Suzuki which will be introduced at the same time. The Geo Metro will also be introduced this Fall. The Metro is similar to the new Suzuki Swift. The Metro will eventually replace the Chevy Sprint. The Suzuki Sidekick and the Geo Tracker are upsized versions of the Suzuki Samurai. They are wider and slightly longer.

Keyblanks for these vehicles will be available. The blanks are (Curtis numbers) B-69 for the Geo Tracker; SU-17 for the Suzuki Sidekick; B65/66 for the Geo Metro; and SU-15/16 for the Suzuki Swift. We will make more information available on these vehicles in an upcoming issue.

I was reading through the September 1934 issue of *The National Locksmith* recently. (Remember we started publishing the magazine in 1929!) In that issue, Stan Mac Lean, our founder, wrote the following regarding the August 1934 issue:

We had to carry nearly 200 pounds of these bullitens down from the third to the first floor where they are picked up by the mail truck. It is estimated that when each issue is placed in the mails, that should they be piled one on top of the other "flat," they would make a stack about 12 feet high.

That got me to thinking. (Thinking is what I generally do when trying to escape from doing my duties around here...like writing Commentaries.) So I have compiled some facts and figures for you that are more up to date than those published 54 years ago this month.

Our July 1988 issue weighed 15.5 ounces per copy. We printed 20,000 copies. Therefore, the weight of the July issue amounted to a grand total of 19,375 pounds. That's 9.7 tons! (Can you imagine us trying to carry *them* down two flights of stairs?!!)

Stan's stack of magazines back in '34 stood twelve feet tall. An issue today, if it were stacked flat, would reach up to 350 feet tall. That's about equivalent in height to a thirty-five story building! Finally, if the average issue of *The National Locksmith* were placed on the ground end to end, the line would stretch 18,333 feet. That's almost 3.5 miles!

I feel sure that Stan Mac Lean would be proud and happy to learn that the magazine he founded has prospered and continued to grow. I would love to be around in another 50 years to see how much more we'll grow. Maybe some Editor in the year 2038 will put his feet on his desk, grab this issue from the archives, blow off the dust and read these useless facts and figures. Who knows. Maybe it will give him an idea.



Marc Goldberg
Editor/Publisher

September 5

Letters

Comments, Suggestions and Criticisms

The National Locksmith is interested in your view. We do reserve the right to edit for clarity and lengths. Please address your comments, praise, or criticism to: Editor, The National Locksmith, 698 Bonded Parkway, Streamwood, IL 60107. All letters to the editor must be signed.

Cop Comes To Rescue of 'Superman'

Superman can bend steel in his bare hands, but getting into a car with the keys locked inside is another matter. Actor Christopher Reeve, who portrays the superhero in the Superman movies, and some friends left their rented car at a boatyard in Thomaston, Maine, and discovered the keys still in the ignition when they returned on



Monday. They called police, and Special Officer Art Stone came to the rescue with tools to unlock the car. Stone, an auto repairman who was helping out with the town's Fourth of July celebration, got the actor's autograph before he left.

Locksmith Offers Solution For Non-Paying Customer's

This letter is in response to Albert Gifford's letter in the July issue of *The National Locksmith*, concerning non-paying customers.

First of all, people who don't pay for your services are *not* customers! They are *thieves*.

Second, I have a way which I have used very successfully to prevent these thieves from getting my services and not paying for them. Several years ago, I was on-call with the local police department. The police would call me whenever they were called for a lock-out. The town I lived in was a tourist community, and thus we had a great influx of people from other areas come through. Some of these "customers" would try to have me open their car, and not pay for it. A few of them managed to get the better of me until I fought back.

Now, whenever I open a car that has the keys locked in it, as soon as I open the car, I simply grab the keys first

thing, and hold the keys until I am paid. If the customer tries to renege, I simply toss the keys back into the car or trunk and shut the door (or trunk lid), locking them in again, and walk toward my vehicle, telling them at the same time that I do no work for free. Usually, when the "customer" sees that he is back to square one with his lock-out, he will beg me to come back and open the car again, at which time I demand payment in advance, and charge for one service call and two openings.

Daniel Sealy
Oregon

Serviceman Offers Rules To Assure Prompt Payment

I was interested and somewhat taken by surprise by the letter from Albert Gifford of Rhode Island in the July *Letters to the Editor*, concerning his difficulties in receiving payment for work done, and receiving bad checks in payment.

The reason I was taken by surprise is that in the nearly 15 years that I have been in business as a full-time locksmith I have only twice received a check that bounced, and both times the person that issued the check has made good the amount as well as the bank charge for processing a bad check! I have *never* had someone tell me that he couldn't find his wallet, or use some

Continued on page 101



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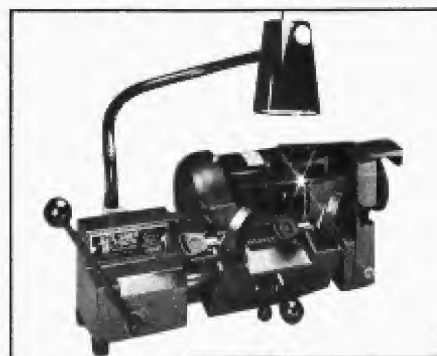
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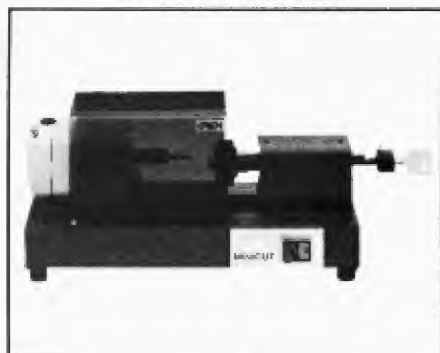
Saber Tooth



Third Prize

A fast semi-automatic duplicator featuring carbide cutter, full 1/3 hp motor, 2400 rpm. Working lamp and deburring brush are standard. From The Locksmith Store.

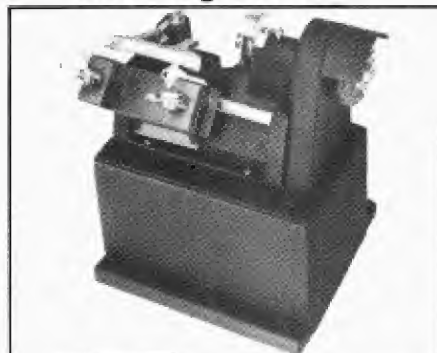
Ilco KD94



Fourth Prize

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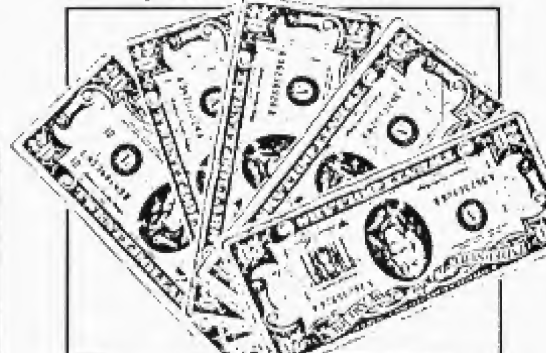
9150 Speedex



Fifth Prize

The Speedex has been transformed from the old stand-by to the machine for today's needs. Features double sided jaws. From HPC.

\$100.00 Cash



Sixth Prize

Everyone can use a few extra dollars! This prize will brighten your day...and fatten your wallet.

Contest Rules

All you need to do to enter is submit a tip, covering any aspect of locksmithing to *The National Locksmith*. Certainly, you have a favorite way of doing things that you'd like to share with other locksmiths. Why not write it down and submit it to: Steve Spiwak, Technitips' Editor, *The National Locksmith*, 698 Bonded Parkway, Streamwood, IL 60107.

Tips submitted to other industry publications will not be eligible! So get busy and send in your tips today! You may win cash, merchandise, or even one of several key machines! At the end of the year, we choose the winners of the above prizes.

Last year dozens of people walked off with money and prizes. Wouldn't you like to be one of the prize winners for 1987? Enter today! It's a lot easier than you think!

Every Tip Wins 'Locksmith Bucks!'

Yes, every tip published wins a prize. But remember, you must submit your tip to *The National Locksmith* exclusively. Each and every tip published in Technitips wins you \$20.00 in Locksmith Bucks! Use this spendable cash toward the purchase of any books or merchandise from *The National Locksmith*. You also receive a Bonded Locksmith bumper sticker, decal and patch. Plus you are now eligible for the really big prizes!

Best Tip of the month prizes!

If your tip is chosen as the best tip of the month, you will win \$50.00 in cash as well as \$30.00 in Locksmith Bucks! Plus you will receive a quartz Locksmith watch, a Bonded Locksmith bumper sticker, decal, patch and a Locksmith Cap. Plus, you may win one of the great prizes pictured above.

Technitips

Helpful Hints from Fellow Locksmiths



Send me your Technitips. Who knows, you may be our next winner! c/o The National Locksmith, 698 Bonded Parkway, Streamwood, IL 60107.

by Robert Sieveking

This month's Technitips show some interesting methods for overcoming a few common automotive lock problems and an interesting solution to a file safe lockout. Hopefully some of these tips will tickle your thinking. If one tip helps you improve the quality of service you deliver to your customers, or make a particular job go a little easier and faster, then this column is a success.

I've given a great deal of thought lately, as to the wisdom in sharing some of my best tips with my apprentices. Once a secret is revealed, you can't take it back. When a helper thinks he has all the answers, he might move in next door to become a competitor, stealing some of your best customers. He might start a part time, after hours locksmithing business on his own.

After an apprentice has been with the shop a number of years, does he become a liability or an asset to the company? Some of the shop owners I have talked to lately are of the opinion that the secrets of the trade should remain just that, secrets. Locksmiths are an independent group, whose expertise is unique and for the most

part concealed, as it should be, from the general public. Security should be a major concern of us all, in terms of guarding the tricks and special knowledge we have which allows us to defeat and bypass locks of all types. But within the trade, we should be open and share some of our best discoveries and inventions with our peers. If I didn't teach my apprentice to impress a lock, I would be a pretty poor master. If my apprentices couldn't perform in my absence, that would mean that all jobs that required that a lock be impressed would have to be done by me. How can a shop grow and prosper if the master is the only locksmith and the apprentices are only ever allowed to be helpers?

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September's Best Tip

I recently had the opportunity to open a Mosler two drawer fire file. The customer had tried to change the combination on the lower drawer, had locked the cabinet and was unable to dial it open again. Upon discovering that the customer had tried to change the combination, I further learned that he had used an S&G padlock change key with the Mosler lock. This had left one or more of the wheels free (or

unlocked) when the combination change was completed. Luckily the bottom drawer was the locked drawer, and the top drawer was still open.

The top and bottom drawers are divided by a thin piece of sheet metal that is spot welded in place. (See illustration 1.) After removing the top drawer, a small cold chisel quickly removed the divider. This allowed the lock in the bottom drawer to be disassembled and the

THIN METAL PLATE SEPERATING DRAWERS

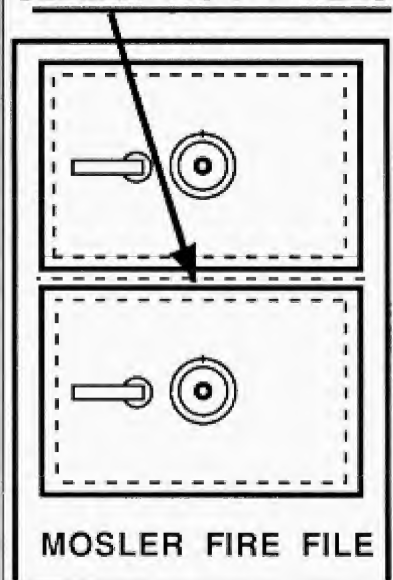
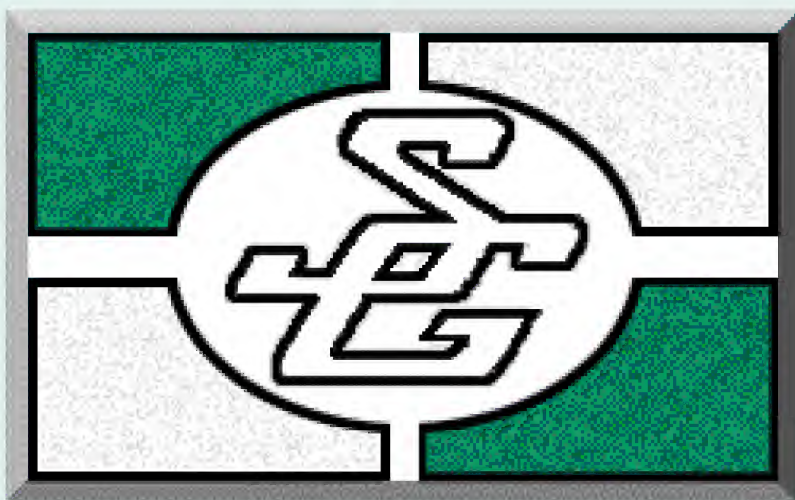


Illustration 1

drawer opened in short order. After carefully flattening the distortions in the divider, it was pop riveted back in place, to restore the security of the bottom drawer. The lock in the bottom drawer was properly combined and the file placed back in service with no damage to the drawer.

Larry Thompson
Arkansas

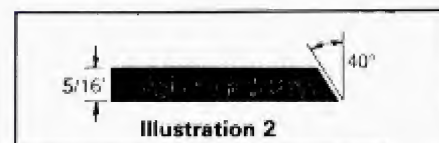


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This tip is one that should interest those of you that generate first keys and keys by code with depth and space keys. Here are two tips that will help you to make the ramps or transitions from one cut to the next look more uniform and smooth.

To insure the proper angle between the cuts use a piece of flat spring steel, cut to a 40 degree angle as shown in illustration two. Hold the tool beside



the pattern key while duplicating the cut onto the second key. Use the angle of the tool to establish the ramp in the second key, when the adjacent cut is to be shallower and there is a possibility of damaging the cut key if you slip off the ramp in the depth and space key. (See illustration 3.) This is a real problem when using a single angle cutter,

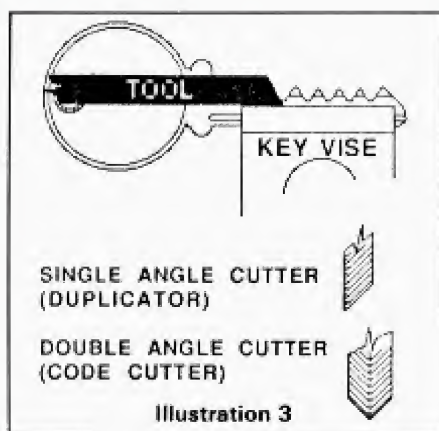


Illustration 3

which has a flat side on one side and the normal angle on the other. Using a double angle cutter will also eliminate this problem.

A set of depth and space keys, as shown in illustration four, which con-

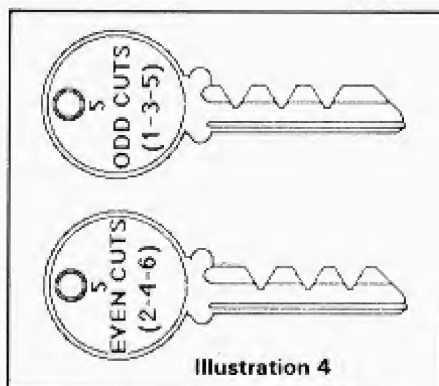


Illustration 4

tains the even cuts for a particular depth on one key and the odd cuts for the same depth on another, will give a full ramp on the space key, eliminating the problem of mis-cutting the ramp angle when coding a key using a duplicating type cutter. Note that even the deepest cut will leave a ramp which is adequate for even the highest adjacent cut difference.

Jon Tikker
California

This tip is for those who are having trouble staking the B&S spring retainers into the sidebar type locks common to most GM autos. The problem is keeping the spring retainer down while you stake it in place. My solution is to bend the tabs slightly, as shown in illustration five. With the tabs bent as shown, start one tab into the lock and rotate it until the second tab can be started into the opposite slot in the lock. The tension of the tab will now hold the retainer in place until it can be staked down permanently.

Leo Koulogianes
Tennessee

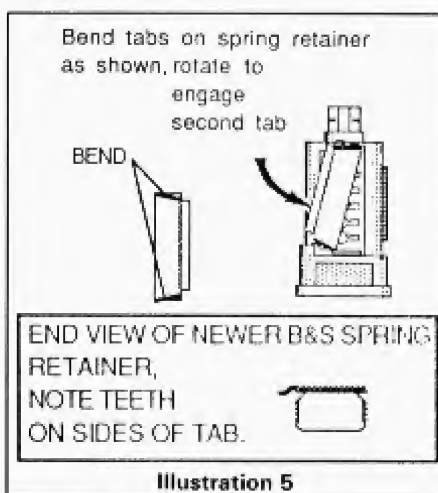


Illustration 5

Editor's Note: You will find that the newer Briggs & Stratton spring retainers have eliminated the problem you describe. The new spring retainers have serrated tabs. Teeth on the tabs, grip into the slots to hold the retainer in place for staking. (B & S pn.#321127).

This tip concerns a method for the removal of a broken key from a Ford lock. After a few seasons, if a broken key is not removed from the lock, the key corrodes in the lock and becomes

Continued on page 14

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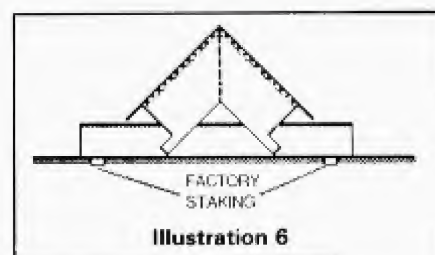
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almost impossible to remove by normal methods. By drilling a small hole in the rear of the plug, a pin punch can be used to dislodge and drive the key out the front of the lock case. Hold the shutter open during the procedure to prevent the key from jamming behind it. If the pins are corroded in place, loosen them up with a little spray oil for easy removal, then recombine the lock with new pins and springs.

Perry James King
Texas

Here is a little tip that should simplify the installation of a Ford spring retainer, when you recombine or disassemble the cylinder for service. Because the retainer is staked in place at the factory and the staking is difficult to undo when a new retainer is installed, I have come up with a way to install a new retainer without disturbing the factory staking.

Simply cut or file a "V" notch on both sides of the retainer as shown in illustration six. This will allow the retainer to be bent as shown. This allows the feet of the retainer to slide

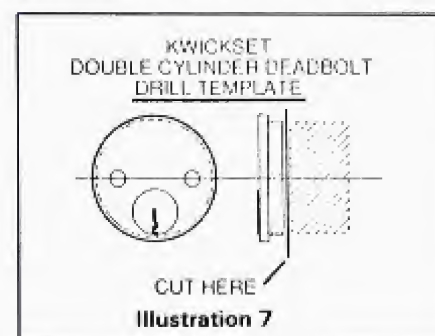


down into the groove in the lock cylinder, under the factory staking. When the retainer is flattened down (straightened), the feet will expand under the staking to form a tight joint. This tip makes replacing Ford spring retainers a snap.

Ronnie Moore
Illinois

This shop has had a couple of lock-outs involving the Kwikset double cylinder deadbolt. The major problem is that the outside actuator broke at the rear of the cylinder. The customer, after experiencing difficulty extending or retracting the deadbolt, applies too much turning force and shears off the actuator. This tip will allow you to remove the lock body from the door to retract the deadbolt, with very little trouble.

Salvage a Kwikset double cylinder deadbolt lock body from the scrap bin. Peel the face cap off the lock case and Epoxy the plug and cylinder into the outside housing. Be careful not to get epoxy in the keyway. Cut off the front 1/4" of the housing, with the lock plug in place. (See illustration 7.) You now

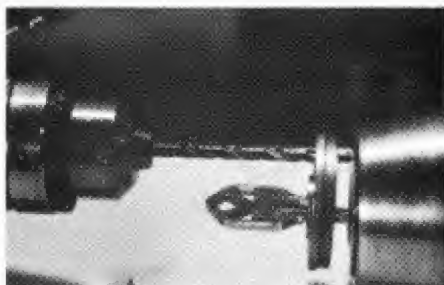


have a template for drilling the Kwikset deadbolt. To align the drill guide, simply place a blank key through the keyway of the template and into the keyway of the malfunctioning lock. (See photograph 8.) The holes of the template will align your drill for removal of the mounting screws. (In some cases, the drill will unscrew the mounting screws.) Using different templates, the same technique can be used on

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8. Blank key inserted in keyway of the template.

most rim cylinders.

Bill Simmons
Oregon

This tip might simplify the opening of a Ford Taurus or Mercury Sable, if the trunk must be opened and the lock refuses to pick. In some cases, the trunk lock is damaged by amateurs that still think a screwdriver is an appropriate tool for forcing a lock. By the time the locksmith gets to the job, the simple opening has grown to a major production. This method completely bypasses the trunk lock and opens the trunk without further damage to the lock.

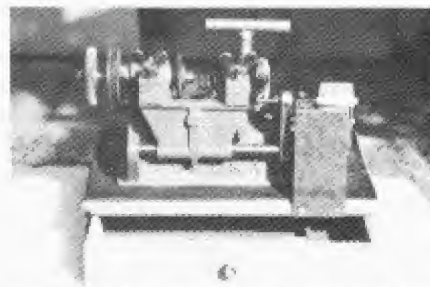
Above the licence plate, you will find the lock cylinder retainer and its attaching rivet exposed. Chisel the head

off the rivet and drive the rivet through the retainer with a small punch. Using a screwdriver, pry the retainer down to allow the lock to be removed. Be careful not to damage the paint around the lock. After the lock has been removed, the trunk can be opened using a slim screwdriver. Repair or replace the trunk lock and reinstall the lock retainer. Pop rivet the retainer in place to complete the repair.

Russel Elswick
Kentucky

This tip is for the modification of a Foley Belsaw key machine. With many students being issued a Belsaw model no. 200 key machine, I believe these improvements should make the task of cutting keys in the field easier. The machine and base are really all you need to rekey the cut keys without returning to the shop or truck. We carry the kit up several floors in office buildings to do lock work.

In photograph nine you can see that there is a drawer under the machine for tools, files, a pin kit, notebook and etc. A nail at the rear of the top, drops through a hole to lock the drawer in place. The "T" handle allows the

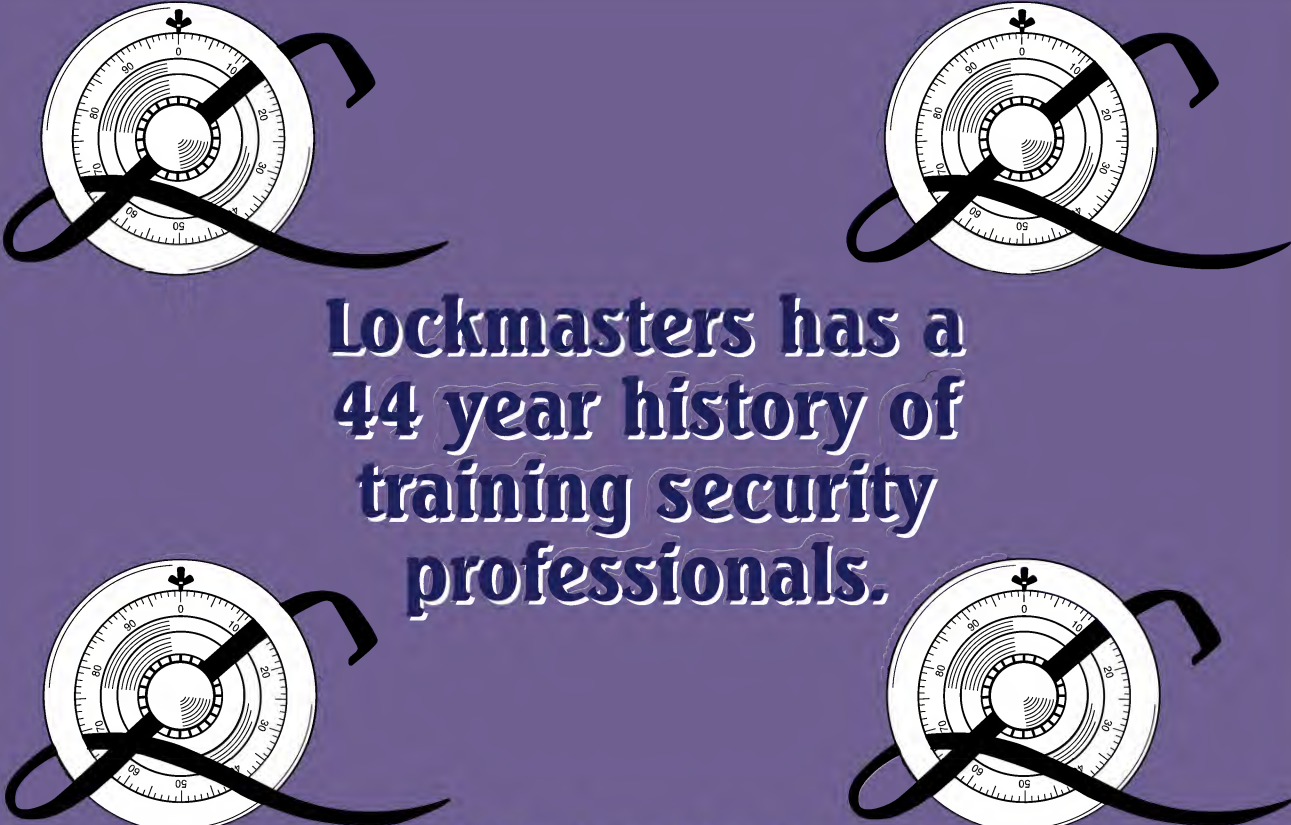


9. Modified, portable Foley Belsaw machine.

machine to be carried upright. A hook, attached to the micrometer pedestal, holds the carriage up and prevents it from hanging loose when not cutting keys. A portable lamp (not shown) attaches to the "T" handle to provide light in dark places and a vise can be attached to the rear of the table for filing keys or holding cylinders.

The entire kit was made from scrap pieces of material and did not cost anything, but it is the very handy for working in high rises and office buildings. It has also served very well when working aboard some of the ships in the shipyard, where running back and forth to a van or shop would be impractical. It's a locksmith shop with a handle on top.

George Bow
Hawaii



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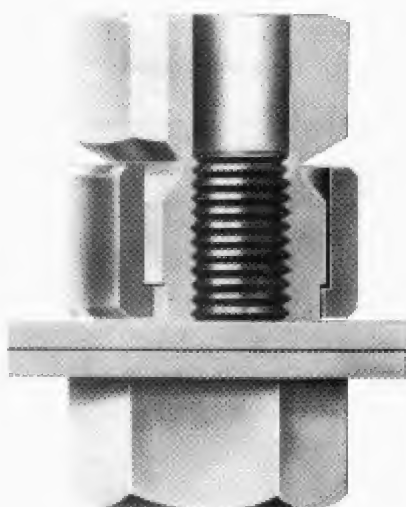
Newsmakers

New Products and Industry News

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CCL Security Products Introduces New Keyway

CCL Security Products, manufacturer of specialty locks and Sesamee padlocks, recently introduced the "RI" keyway for the new Olympus Series cabinet locks. Formerly available only in the "D4291" keyway, CCL will now market the Olympus locks in both keyways.

The Olympus Series cabinet locks incorporate a set screw on the barrel of the lock which allows for easy removal of the solid brass cylinder and plug for rekeying purposes making the process efficient and profitable.

The addition of the "RI" keyway will allow the Olympus Series pin tumbler locks to be keyed into new or existing CCL, keyed alike and masterkeyed systems. The Olympus locks are available keyed alike, keyed different and "0" bitted.



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The National Locksmith Presents New Video

The National Locksmith has introduced its latest video called "G.M. Steering Column Procedures." This video was professionally filmed and produced by a commercial video company. Therefore, the picture and sound quality is quite excellent. Covered in the video are the standard G.M. tilt column, the Berreta column and the telescoping steering column. An explanation of older column procedures is also given. In this manner, the film explains virtually every G.M. steering column on the road.

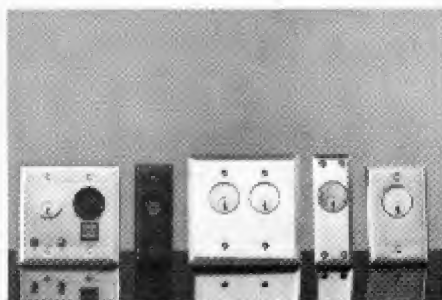
Automotive experts Shirl and Norm Schamp are your hosts for this video which is available only in VHS, priced at \$49.95. The introduction shows all the tools you need to use. Then the video shows close-ups of every step needed to disassemble and reassemble each of the steering columns. The video runs for slightly more than one hour. It is geared for both the veteran and the beginner locksmith alike. Established shops can use the video to train the employees.

SDC's Multi-Function Key Switches

Compatible with standard and interchangeable core mortise key cylinders, Security Door Control's key switches may be keyed the same as existing mechanical locks and incorporated into master key systems. With 18 different contact configurations, virtually any keyswitch application can be met.

Available options include narrow faceplates for frame mounting LED indicators, sirens, time delays, push switches, and plated architectural finishes.

Applications include access control of doors, gates, elevators, alarm control, and motor control.



McDonald Dash's New Alarm Lock

McDonald Dash Locksmith Supply announces that the new Alarm Lock Model 25 Multigard exit lock is easy to install, functional, efficient and rugged. It is easy to arm or disarm by key, and very simple to lock and unlock. The Model 25 Multigard exceeds U.L. panic lock standards for 100,000 consecutive operation cycles and for withstanding outside pull pressure of 250-lbs. while still operating.

The model 25 provides maximum protection from unauthorized entrance, yet allows an easy and instant emergency exit.



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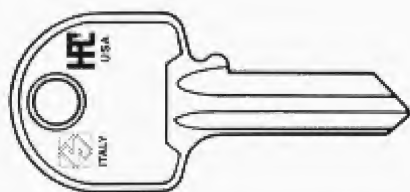


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HPC's Introductory Special On Neuter Head Blanks

H.P.C. announces an introductory special offer on the HPC/Silca Neuter Head key blanks.



From now through December 1, 1988 HPC is offering free tooling for the coining dies (straight line only) a \$75 value with the minimum purchase of 1000 key blanks. The blanks may be mixed in minimum quantities of 100 per number from our large selection of 31 of the most popular domestic key blanks.

The key blanks are personalized with raised letter coining on the border and all copy. "Do Not Duplicate" may be coined on the opposite side at no charge.

The HPC/Silca key blanks are the finest quality brass keys and are nickel

plated for a long lasting finish. The quality milling and key dimensions will give a perfect cut every time.

Shipping will begin by mid-October. Allow 4-6 weeks on initial orders for production of tooling. Repeat orders will be shipped in 7 days. Contact your HPC distributor or H.P.C. for details.

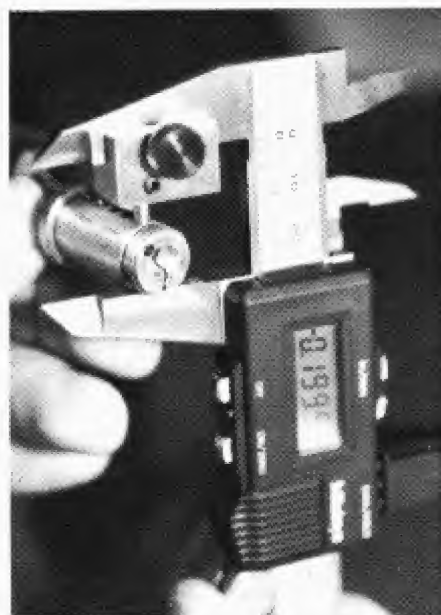
See the HPC advertisement in this issue for the key blank numbers offered and suggested dealer pricing.

Circle 386 on Rapid Reply

Continental Micro Measuring System

Continental Micro's Measuring System is a multi-purpose electronic caliper with probe attachment designed to simplify pinning and measure a wide variety of standard and specialized keys.

The stainless steel probe head is easily attached with a thumbscrew. For pinning, the plug with cut key inserted is first measured and the caliper is "zeroed" at the shear line. The pinning probe is then inserted into each successive cell until its tip contacts the pin seat. The direct reading display shows



the exact bottom pin length to use. Pinning probe may be reversed to its flat side for determination of master pin lengths.

An optional battery/AC powered printer/processor is available. Connected to the caliper, measurements are printed on a paper tape with the touch of a button.

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Opening A Mosler Lug Door

"I sat back and contemplated the problem, and had a pretty good idea of what happened by questioning the manager, and by the physical evidence."



by Dale Libby

Impossible as it may seem, many safemakers have inadvertently made mistakes in their safe designs over the years that safemen will and do take advantage of in the opening and servicing of all types of safes. Mosler Safe Company is no exception to the above rule. Most of these inherent problems

happened many years ago on older models of safes, and one specific problem we will discuss here pertains to a specific lug door safe of ancient days, that however, is still used quite a bit in the Midwest.

Before attacking the problem, we will discuss why there is such a problem in the first place. It has to do with bolt detents. A bolt detent is a mechanism which keeps the bolt out of harm's way when the safe, vault, or round safe door is open. The more or less recent Mosler round door lug safes have a button detent around the edge of the safe door. When the round door is open, the button pops up and holds the open bolt in

flush with the side of the round door. When the door is closed, the edge of the safe contacts with the jam of the door and depresses the bolt detent so that the combination dial can be turned and the safe locked up. To get the bolt out to service or for combination changing, one has to push the ball bearing button in with a finger and turn the dial. This will facilitate the removal of the lock bolt cover on Mosler 302-402 locks so that the combination can be changed.

Before the button type of bolt detent was used, Mosler used a detent rod inside of the crane hinge of round lug door safes. Unless you have ever taken a round door hinge mechanism apart,

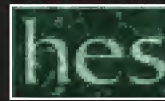


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you may not have known that this detent was here. The purpose of this detent, was the same as the newer version, (i.e. to keep the bolt in while the door was being closed, so that the bolt could not be harmed). This was a troublesome sort of detent that was not serviced easily, and could cause problems to the unwary.

The detent rod was activated when the door was opened by lands and gearing plates inside the lug door. For the rest of the discussion, I will talk about the opening handle as a reference point. When the handle is in the 9 o'clock position, we will assume that the door is in the locked position and that the bolt is free to travel in and out. When the opening handle on the crane mechanism is at the 11 o'clock position, we know that the door has rotated enough to let us open the lug door and crane mechanism. For this discussion, it is not necessary to know the handing of the combination lock involved, for either handing of the lock, right handed or left handed, does not matter. The locking bolt will come out at either 9 o'clock or 3 o'clock when the safe door is locked. Again, for this discussion, it makes no difference.

The inner crane hinge detent bar

worked as follows. The combination was dialed to the dial stop position. The opening handle was turned clockwise from the 9 o'clock position to the 11 o'clock position, and the door opened. What cannot be seen, is that when the opening handle is raised, a long rod or pin is forced into a slot in the combination dial spindle or a flat on the side of the dial spindle. Whatever particular mechanism is involved, when the handle is in the 11 o'clock position, the dial cannot be turned, either right or left. If the dial cannot be turned, then the lock bolt (at either 3 or 9 o'clock) cannot be extended. Before the bolt can be extended with the door open, the opening handle must be turned to the 9 o'clock position and the rod will retract from the dial spindle flat or slot, to let the dial turn and extend the bolt.

Another side effect of this inner hidden crane hinge detent mechanism was that it did not allow the dial and spindle to be removed when the door was open, unless the opening handle was turned to the 9 o'clock position. I have had calls from safemen and locksmiths over the years for the "secret" of removing the dial on a Mosler Lug door. I told them that first the door must be in the

proper position before they could do it.

Remember, the detent should never be removed on either round or square doors. It is there for a very important purpose, that of keeping the bolts, and what they are attached to in good working order. This is especially important on newer square safe doors and money chest doors. These doors have a detent mechanism activated by a pin or rod, usually on the hinge side of the door, which keeps the locking bolt "in" while the customer slams the door shut. At least the bolts are not crunched by the carelessness of the violent safe door slamming customer.

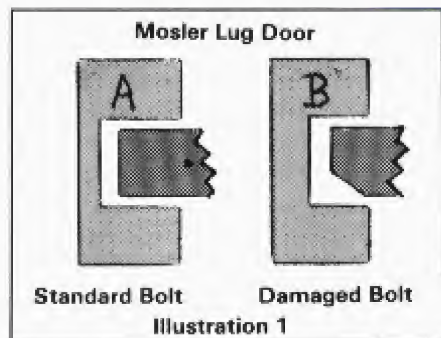
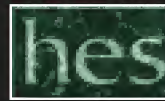
Before detents were used on round lug doors, many problems arose from customers mistreating the safe bolts by having the door in the open position, slamming the door shut, and trying to turn the safe door closed with the bolts in the extended position. Whether the door had the detent and it was removed or broken, or in the case of the early Mosler lug doors, where there were no detents, the locking bolt became damaged.

In illustration one drawing "A" shows what the perfect lug door lock bolts look like when it is locked. It fits into a cutout behind the jamb of the



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round door, and keeps the lug door from turning to the open position. Drawing "B" represents what happens when the detent does not work. The edge of the bolt is smashed down in the direction of the rotation of the door. This is not important at first, but as the bolt is abused on safes with no detents, the angle gets greater and greater, until trouble is just waiting for the crazed customer to take over. Here is a compiled scenario of what has happened to the lug doors that I have serviced:

The customer opens the lug door safe, and leaves the handle in the 11 o'clock position. Somehow, the dial gets turned (remember there are *no* detent mechanisms on these early Mosler round door lug safes or chests) and the locking bolt gets extended. The

customer then gets in a hurry and slams the round door shut, and tries to turn it to the closed position. It will not go. Sometimes, the customer uses force in trying to close the door, feeling that any force can only help the door close. Eventually, he figures that he must dial the combination when the door is in the open position or the handle is at 11 o'clock position to again close the door. This fact gets him real mad, that he has to dial the combination twice to open and close the safe once. This does not happen every time he opens the safe, but over the months and years, this happens quite often.

What happens next, as the bolt becomes more and more scarred and distorted, is that when he tried to close the door after repeated forcings of the handle is that the door will turn about $\frac{1}{4}$ " to $\frac{1}{2}$ " before it binds up. The edge of the bolt and the inner mechanism have become slammed enough to let the door turn just a little further each time than it really should turn. If the door turns enough, with the slack in the mechanism, sometimes the door will become jammed slightly and cannot be opened or closed, even though it really is not locked. Here is where the customer gets crazed.

First, the person will hit or try to force the door into the locked position by any means handy, probably using a hammer. First, because it is easier, he will hit the handle down to try and lock the door. When that does not happen, he will hit the handle up (or clockwise) and the safe will open. The net effect of this hammering is to further damage the edge of the locking bolt, and to bend and deform the inner safe mechanism lock and attachments. Another obvious danger is that the locking handle which is made of a bakelite substance will shatter and break off. This is an obvious clue that something is amiss.

I have had three of these eventual lockouts, and the lock used was the old Mosler #1, or what I call the Mosler Flapper lock. It is very easy to determine if this lock is being used. Just have the customer dial the combination to the lug door. The last turn will be *left to stop*. This is the lock that if you were looking at it from the outside and it was right handed, the 'flapper' would be at 7 o'clock. (See illustration 2.) The last turn is left to stop, which is a giveaway as to this type of lock. I am sure that Dave McOmie can fire all the combination lock numbers at you, but from the



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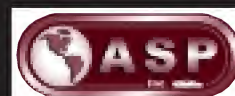
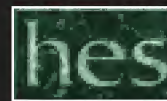
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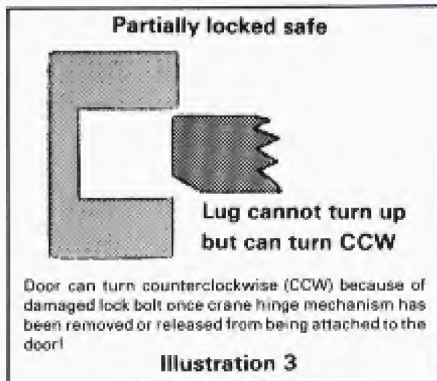
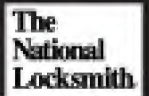
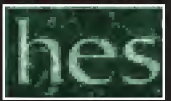
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either right or left handed, with a relock bolt in the opposite position of the operating/opening bolt. The bolt cannot be drilled too easily because there are usually three or four drill rods that are very hard inserted in the door above the operating bolt to protect it from drill attack. This is not the way to go on these safes. Now the stage is set for the final lockout.

After many such problems with the door snagging and the repeated opening and closing of the door, and the hook bolt mechanism locking, and being helped open with a hammer, one time the door will jam. And because of the tolerances that have been widened the customer will be able to close the door about 2" out of the 6" or 7" of travel that it takes to close the door the fully. Because of the sloppy tolerances, it will be impossible to beat the door to the open position. This is because the bolt is now too sloppy in the hole in the edge of the safe door. It will be like a Chinese Finger Trap. The harder you pull on the trap with the fingers, the tighter the mechanism will become. However, because of the damaged bolt and the wear of the inside parts, the door can be easily hammered into the closed position with the opening handle in the 9 o'clock position, if the handle is even there after the hammering sequence.

The next day, or the next time the customer wants to open the lug door, surprise, surprise, the dial will not stop moving, and the door will not open. Here is where you can open the door in three minutes without drilling or even knowing the combination beforehand.

Here is what has happened. By pounding the bolt handle or the handle protrusion, the customer has forced the thrown bolt to force the inner flapper connected bolt mechanism to disconnect from the combination lock. The bottom of the flapper has a raised edge that connects with the hook bolt mechanism to disconnect from the combination lock. The bottom of the flapper has a raised edge that connects with the hook bolt mechanism at the base of the combination lock. By pounding the opening handle to the fully locked position, you have forced the bolt in when the combination lock and the flapper have not been in the open position. Remember, the bolt was extended somewhat, and the combination was off enough to put all the pressure against the small flapper in this lock. The result is that the flapper knocked "off track" and sits askew in the lock.



The bolt is shown in illustration three. It is not fully extended. Since the top of the bolt is flat and in its cavity, it cannot be forced up into the open position, even though the bolt is not fully extended.

The first one of these safes (or money chests, if you prefer) presented me with the following problems: No contact points when I dialed the combination; no movement of the safe door, it was locked; no knowledge of the whereabouts of the locking bolt.

I sat back and contemplated the problem, and had a pretty good idea of what had happened, by questioning the help, the manager, and looking at the physical evidence of the hammer and the shattered handle. Aha, insight. If

this works, this will be super easy. On the first safe, I used a procedure that I later modified on the next two exact same type of problem safes.

On the first Mosler Lug Door, that was locked like this, I pulled the dial and dial ring to expose the crane hinge mechanism giant cap screws. The crane hinge mechanism is held to this type of door by one of two different types of large cap screws. Either they are Allen type or 12-sided torx type of screws. The Allen heads can be removed with a large Allen wrench, and the other type can be removed with a thin walled 1/2" or 9/16" socket. The opening handle can also be removed to facilitate the removal of the crane hinge. Here is the secret.

The crane hinge mechanism controls the movement of the safe head or door, not the door itself. After removing the crane mechanism and reinstalling the handle on the now flat safe head, I turned the handle from the 9 o'clock position to the 7 o'clock position, and the safe head fell off and crushed one of my favorite flashlights. The only thing stopping the safe head from turning counterclockwise was the crane hinge. Once that was removed, because of the angle on the bolt, I just had to turn the

door gently and it turned off and fell to the ground. It was that easy.

In the next two Mosler Lug Doors, with the same similar problems, (all three were in different cities), instead of removing the dial and dial ring to get at the cap screws, I just removed the whole hinge from the safe door, and turned the door and the unconnected hinge so that the handle was again at the 7 o'clock position, and again, the door opened. In less than three minutes in each of the latter safes. The first one took me about 10 minutes to figure everything out.

Repair on these units can be tricky. If you have not pulled the dial and ring, repair is not too hard. Parts just have to be bent back into the proper position and the lock checked out. If the lock is shot, because of the customer's repeated hammerings, be prepared to wait for months to get a new lock from Mosler. I really do not think that these specific locks are available anymore, and retrofitting something new to this antique safe is a game of futility and frustration. Best bet is to sell the customer something newer in a safe or money chest. Get the antique off the active list and into the dumpster where they belong. ■

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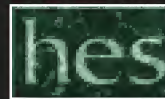
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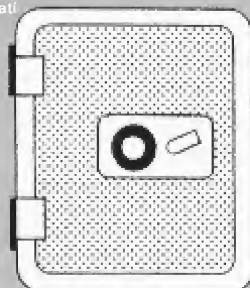
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Safe

Information

In this section you will find a number of products by various safe manufacturers. As a locksmith, you offer security of many kinds to your customers. Many of you already handle safes; some of you do not. However, almost all of you do know that selling safes can be a profitable experience for a locksmith company. First there is the profit on the original sale. Then there is the follow-up service you can offer. Calls such as combination changing can really help pay the rent.

In this product review section we have tried to bring together a representative sampling

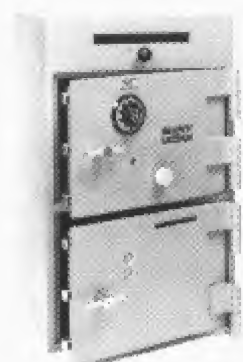
of the safes that are offered to the trade. Of course, it is impossible to have every manufacturer represented here. But we have tried to assemble a good sampling of material for you to examine.

If you feel you need more information about any of the items presented here, please use the Rapid Reply Card to request literature. You will find the reply card between pages 104 and 105 of this issue. If you do not currently handle safes, give it some thought. You might be overlooking a product line that could add to *your* bottom line. **MG**

Brown Safe's Fast Food Unit

Brown Safe Manufacturing now offers a versatile safe designed especially for the fast food and restaurant industry.

This safe features a heavy-duty rotary hopper, multiple active and passive relocking devices on each door, and heavy-duty hinges. Optional features offered are, slotted doors, mechanical or electronic time-delay locks, double or single nose SD locks, and hold-up alarm locks.



Fichet Introduces Carat

Fichet announces the arrival of its newest line of high-security safes, the Carat Gold safes. The Carat is a safe for high-risk businesses, providing protection against professional burglary and fire.

The Carat features over 4" of special material offering excellent tool and torch protection. In addition to burglary protection, the Carat completed a one-hour, 1,700° F fire test to prove its fire resistance.



Fort Knox Guardian 2000

Fort Knox has recently introduced a new model G2000 safe in the large capacity version. This safe comes in three distinctive colors and has many interior options to choose from.

It weighs 900 lbs. and is used as either an all shelf safe or gun safe. Up to 56 guns can easily go into the unit. A new optional fire liner is now available using high grade U.L.-rated material.



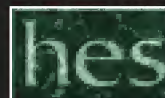
Indiana Cash Drawer SL Series

Indiana Cash Drawer Company, is a supplier of both manual and electronic, computer-compatible cash drawers of steel or hardwood construction.

Available in many styles and sizes, for over or under-counter installation, and with optional locks and security systems. Indiana Cash Drawer Company products adapt readily to custom applications.

Shown here is the SL series cash drawer sold with computer interfacing, and available in a selection of popular computer colors.





LaGard Announces Time Delay Lock

LaGard has announced release of an innovative time delay lock incorporating an LCD time display, annunciator, and battery compartment in the external case with the electronics mounted in the back cover of 3330 combination or 2200 key locks. Activation is via a lever switch in the lock. A miniature low power solenoid controls bolt retraction.



LSDA Provides In-Floor Safes

LSDA, In-Floor Safes provide burglary protection for valuables.

The five models available are constructed from high grade steel with continuous electrical welds on the wall seams for strength. The doors on each safe, made from 1/2" thick A-36 steel, are recessed below the collar of the safe to resist pry bar attacks.

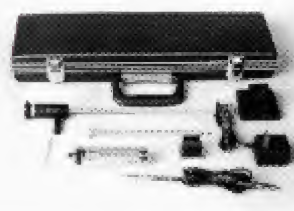
Each LSDA In-Floor safe comes complete with a 1/8" thick steel cover plate.



MDS Announces Prism-Scope™

Medical Diagnostic Services, Inc. (MDS) announces the availability of a new fiber optic Prism-Scope™ to compliment their line of locksmith/safeman diagnostic tools.

This new borescope system is designed to provide superior viewing of the wheel pack in precision safe work. The complete kit includes: fiberoptic borescope; 90° slide on 6 mm mirror tube which allows 360° rotation with the touch of a finger; MDS deluxe power handle; heavy duty clip-on magnet; 3.6v rechargeable Magna-Pak™.



Meilink's New Time Delay

Meilink Safe Company announces the next generation of time delay locks, one with audit trail capabilities.

The TDA series is intended for retail establishments where internal theft represents a major potential loss area. The Meilink lock improves internal control by providing separate keys for each clerk or manager, up to eight per lock, and recording the activity for each key. An internal memory and clock with self-contained 5-year battery, independent of the outside power.



National Security's Magnum Safe

The top of the line Magnum safe from National Security Safe Co. incorporates all the companies standard features plus many extra options.

The Magnum has 19 locking bolts—7 on each side, 3 on top, 2 on bottom. It features a black exterior and a silver 21-gun combination interior.

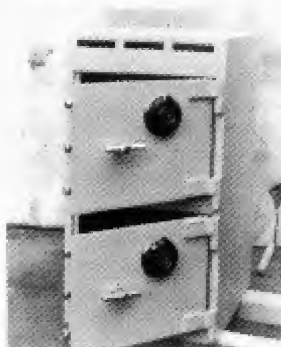
Options include: gold plating on the handle and lock dial brass hinge caps, a custom handle, and a brass safe lamp.



Pacific Security's Cash Control

A new "cash control" depository safe is now available from Pacific Security Products Co. This depository unit offers under the counter protection for "trimtill" deposits, as well as a large storage area for cash tray and coin bag storage.

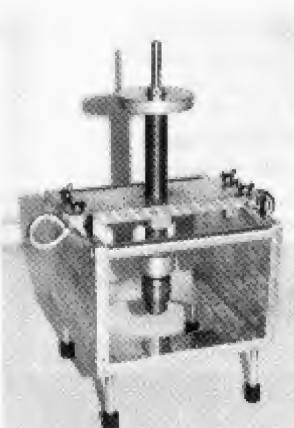
Three individual slotted compartments are protected by double-sawtooth baffles. The large capacity of this unit is ideal for 24 hour store operations as well as multi-cashier situations.



The Penetrator From Lew F. Noyes

The Penetrator safe drill rig which has been invented, designed, and manufactured by Lew and Eleanor Noyes is the answer to penetrating the hardest of hardplate of the most sophisticated safes.

Primarily designed for government G.S.A. containers, the Penetrator is now being used on all types of safes in all parts of the world.

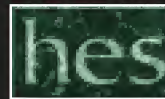


Special Scopes From Pro-Lok

Remove broken keys from locks, look into a drill hole to dial open a safe, or read the tumblers in a wafer lock with Pro-Lock's lock and safe scopes. This scope is sturdy and lightweight, made of a tough impact resistant plastic. It uses a concave mirror to capture and focus light from a high intensity light bulb.

The scope also comes with a non-breakable lens to magnify the image, a soft vinyl pouch, three different size viewing tips, and batteries.

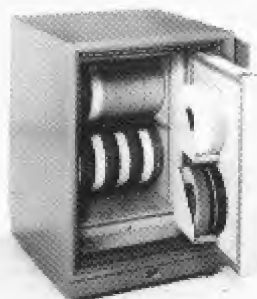




Schwab's New FireGuard Safes

Schwab's FireGuard Media Safes protect invaluable information stored on all forms of EDP Media from fire loss and humidity damage. Each safe offers a customized, factory installed interior to meet each user's individual storage needs.

The safes are manufactured in the USA, and carry US-UL certification of their effectiveness. Schwab also backs these safes with a \$100,000 Covered-Contents warranty.



Sentry's Desk-Top Fire Security

The Sentry Fire Safe media file is a compact, insulated file, measuring 13-9/16" high by 15-3/8" wide by 12-1/8" deep, used for storing sensitive EDP media. It is spacious enough to hold up to 175-3 1/2" diskettes, 110-5 1/4" diskettes, and 50-8" diskettes.

The Fire-Safe media file has been designed and tested to maintain an interior temperature below 100°F when subjected to temperatures up to 1550°F for half an hour.



Executive Series Fort Knox Safe

Fort Knox is adding some new options to their executive series of safes. A new ceramic double wall fire liner is now available. This is the same material being used in blast furnaces to block heat. Another option is the 1 1/4" locking bolts for great security lock-up.

Fort Knox is still using the 5 to 1 ratio rack and pinion gear drive with inside hinges. There are three color choices and many interior configurations to choose from.



LSDA Insulated Record Safes

LSDA, Insulated Record Safes protect vital records from the ravages of fire.

These 2-hour fire rated safes come complete with a 3 wheel key change combination lock with separate key lock affording dual or day lock control, two automatic relocking devices triggered by forced entry attempt, a 3/4" diameter side, top and bottom locking boltwork mechanism, 1/4" steel plate door, adjustable inner shelves and an attractive two-toned brown and beige metallic finish.



Meilink Announces Mixed-Media Safe

Meilink Safe Company has introduced an additional model to its line of data safes, combining protection for both paper records such as computer printouts and more sensitive EDP media. The upper compartment of Model 2150MX measures 21" high and can accommodate printouts in binders or with an optional rod, printouts with center-hung binders.

The lower compartment rated for 150°F protection can store a variety of tapes and floppy disks.



Model H-700 By National Security

This model H-700 is a heavyweight, with single-wall construction.

The H-700 features 12 locking bolts—5 on each side and 2 on top. It has a maroon exterior, with a 15-gun combination interior and a standard handle.

Like some other models, it has gold plating on the handle and lock dial, brass hinge caps, and a brass safe lamp.



Pacific Security Redesigns Chests

Pacific Security Products has improved their chests with a whole family available in "B" and "C" rate construction. All eleven models have been carefully redesigned to insure security.

Visually these chests offer the design features of a much heavier built unit. Feature include large door access to the interior, door swing of at least 180°, massive door framing, hardplate, 1" chrome bolts, secondary relocker and multi-shelf options.



Schwab Safes Protects Papers

Schwab's FireGuard Record Safes offer excellent protection for vital documentation against loss by fire. Choose the interior configuration you need from a variety of special components to design a safe fulfilling your special needs.

The safes are manufactured in the USA, and carry US-UL certification of their effectiveness.





Manipulating A Push Down Lock

"The secret to defeating any locking device lies in complete understanding of the principles of its operation, and specific knowledge of the lock's workings."

by Robert Sieveking

The Star manipulation resistant push down lock is indeed a formidable lock, but it is not impossible to manipulate. In fact, if the proper set-up is made and the correct procedures followed, this lock can be manipulated just as any other group II lock.

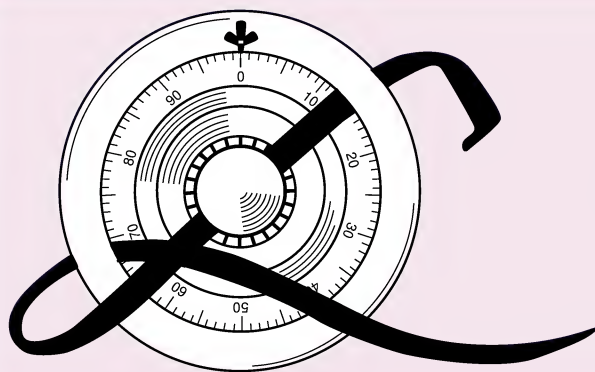
The secret to defeating any locking device lies in a complete understanding of the principles of its operation, and specific knowledge of the mechanical workings of the lock. This article will present the principle of the push down type lock, the sequence of operation for this lock, and one method for defeating it. When I speak of defeating a lock,

this means by manipulation. Manipulation is a logical procedure for interrogating a lock, to determine the locations of the wheel gates and ultimately the correct combination, without penetration or damage to the lock.

Why a push-down lock? What advantage does this lock have over a spring loaded fence type lock? How does this lock indicate? The primary advantage of the push down type lock is the elimination of the contact points that allow a spring loaded fence type lock to be manipulated. As the drive cam of a standard group II lock is rotated through the drop-in or contact area, it is possible to hear and feel the nose of

the lever as it falls into the gate in the drive cam, and is lifted out of the gate by the ramps on either side of the gate. (See illustration 1.) This action, which allows the fence to *try* the wheel pack, determines whether all the wheel gates are present at the fence or not, and is the *window* in the group II locks. This is what allows the manipulator to see the wheel gates during the graphing procedure.

In the case of the push down type lock, the contact points are eliminated. The fence is a part of the fence plate, and the nose of the fence plate does not enter the drive cam gate as the drive cam is rotated through the drop in



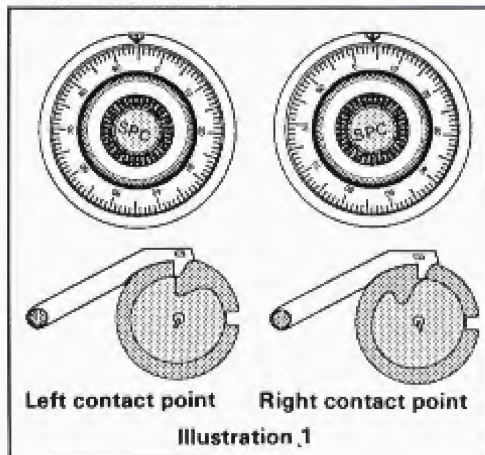
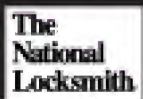
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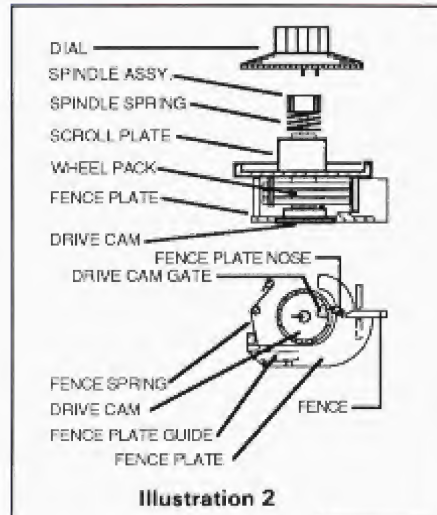


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area. (See illustration 2.) The nose of the fence plate only enters the drive cam gate when the dial is depressed at the drop in point. The drive cam can only be depressed far enough to allow the fence to touch the wheel pack, at or near "0", the drop in point. A raised ridge in the lock case will prevent the

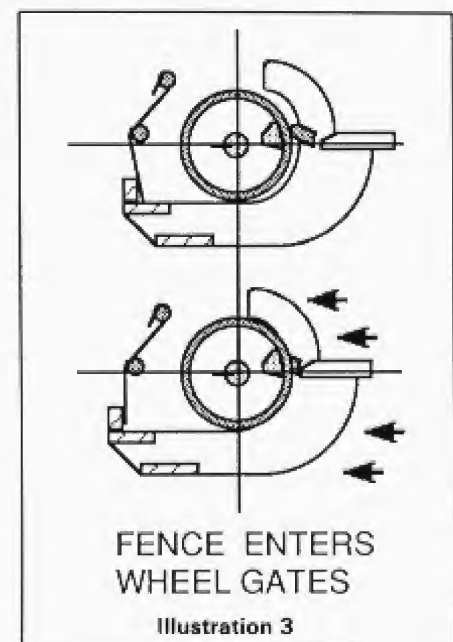


drive cam (and dial) from being depressed at any other point around the dial.

The push down type lock does not exhibit radial contact readings that can be read on the dial. The push down lock will give indication, or show vary-

ing contact readings in the vertical travel of the driver. (The dial, spindle and drive cam are known as the driver group, or driver.)

What is the sequence of operation for opening this type of lock? After properly positioning the combination wheels to bring the combination gates under the fence, the dial is returned to "0." At this point the dial can be depressed to allow the fence to *try* the wheel pack. As the dial is pushed in a downward direction, the nose of the fence plate will slide off of the outer ridge of the drive cam and allow the fence to attempt to enter the wheel pack. The action of the fence spring causes the fence plate to be spring loaded into the wheel pack. If all the gates have been properly aligned at the drop in point, the fence will enter the wheel pack and the nose of the fence plate will enter the gate in the drive cam. This action is shown in illustration three.



The lock is now unlocked. With the dial depressed, clockwise rotation of the dial will cause the fence plate to bear on the fence plate guides, rotating the scroll plate. The door bolts are retracted by clockwise rotation of the scroll plate. The door is open.

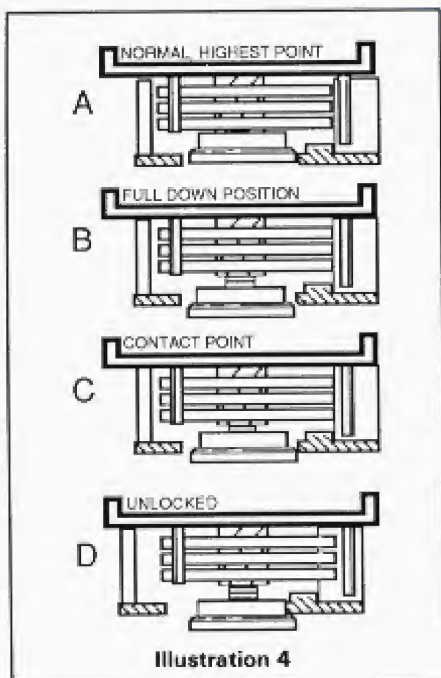
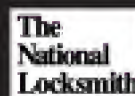
Where are the contact readings taken? What do they tell us about the lock? Illustration four "A" through "D" shows the relative positions of the fence plate, wheel pack and drive cam during the opening sequence.

"A" of illustration four shows the lock in its normal position. Note that the drive cam is at the highest point of its travel. The fence is held away from the wheel pack by the nose of the fence



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plate, which is resting on the lower rim of the drive cam. The dial can be rotated freely in this position. Note also, that the drive pin of the drive cam will engage the number three wheel *only* in this position. As the drive cam is moved in a downward direction, to allow the fence to try the wheel pack, the drive pin will disengage from the number three wheel and prevent movement of the combination wheels.

"B" shows the drive cam in the down position. The dial must be at "0." This will allow the drive cam to bypass the ridge in the cover plate that prevents downward motion of the driver at any but the "0" position on the dial. Note that the action of the drive cam has allowed the fence to move to the left, where it now rests, in contact with the wheel pack (wheel gates not aligned).

"C" shows the drive cam in the position which will reveal the penetration of the fence into the wheel pack. *This is the contact point* that will allow the lock to be manipulated. As we graph the lock, using this contact point, a gate will be positioned under the fence. This will allow the fence plate to move a few thousandths of an inch to the left (in the illustration) or closer to the center of the wheel pack.

As the drive cam rises up to make contact with the fence plate, it will come into contact with the nose of the cam plate at a point lower than if there were not a gate under the fence. If a high spot in the wheel pack were to be present under the fence, the fence plate would be displaced to the right (in the illustration), and the drive cam would travel further up or out of the door,

before it came into contact with the nose of the fence plate.

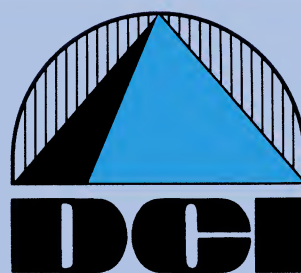
A low spot in the wheel pack will be indicated by a movement of the contact point in a downward direction, or into the door. A high spot on the wheel pack will be indicated by a movement of the contact point in an upward direction or out of the door.

"D" shows the fence plate at the limit of its travel. The fence has entered the wheel pack. The nose of the lever has entered the drive cam gate. The lock is shown in the

proper position to retract the door bolts and allow the safe to be opened.

As the dial moves up, I feel more than one contact point. Why? Before we can begin taking contact readings, we should more closely examine the action of the drive cam and fence plate.

Looking again at illustration four, close inspection of "A" will reveal that the fence plate is not in contact with the scroll plate. Gravity, friction and the action of the fence plate spring allows the fence plate to drop down and away from the desired position to take the



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contact reading. This distance is minimal, but must be considered in our procedure.

When the drive cam is moved to position "B," friction between the drive cam and the fence plate nose will cause the fence plate to move away from the scroll plate. As the drive cam rises up from position "B" to position "C," the drive cam will first contact (first contact point) the fence plate nose, then carry the fence plate up until it makes contact with the scroll plate (second contact point).

Further upward motion of the drive

cam will cause the drive cam to force the nose of the fence plate to move to the right, against the pressure exerted by the fence plate spring. The contact reading is taken at the point that the fence plate is in contact with the scroll plate, but before the drive cam forces the fence away from the wheel pack. The contact point is really pretty easy to feel and hear. This contact point is much easier to feel than most other locks.

How do I measure the differences in the height of the contact points? To

accurately measure the differences in the contact points, a dial indicator is set up as shown in illustration five. A one inch dial indicator is set up using a magnetic base to attach the indicator to the safe head. A one inch dial indicator calibrated in thousandths of an inch is used because an indicator with a shorter travel would not be appropriate in this application. The total travel of the spindle, from rest to the bottom of the sprindle stroke, is about .150". Though it may be only a small point, I prefer to find the contact point and set the indicator to zero at this point with a .250" preload on the dial. This allows the indications to be either above or below the zero set point.



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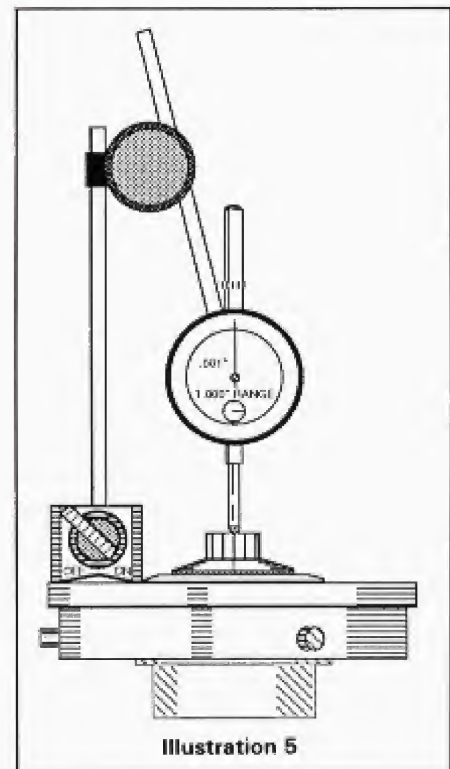


Illustration 5

Once the indicator is set up, it will not be disturbed until the manipulation is completed. This will allow the manipulator to see the progression of the contact points with each successive graphing procedure. It will tell you if your overall contact readings are improving or you have taken a wrong turn in the selection of a wheel or gate location when analyzing the graph results.

Are there any special precautions or procedures for taking the contact readings? To avoid getting erratic readings, make sure the top of the spindle shaft is clean and the pins on the underside of the dial enter the holes in the spindle shaft freely and all the way. Clean these surfaces before you begin. Lubricate the spindle shaft, and make sure it is



operating *freely*. Clean it with spray oil to flush out dirt and grease, then wipe it clean with a rag.

Using both hands, place the thumbs and index fingers on both sides of the dial. The thumb and index fingers should be about ten numbers apart on either side of the dial. Push down with equal pressure on both sides of the dial. The object is to move the dial straight down and straight up. Avoid flexing the spindle shaft or rocking the dial on the shaft. Remember that this lock will indicate a gate by a change in the contact point of about .003". That is about the thickness of this page.

Is there any special procedure used to manipulate this lock? No, the procedure is the same as for any three wheel lock. Because this is a three wheel lock, the manipulation should begin with an all wheels left evolution, every 2½ numbers. Find the *gate center* by graphing each number, from five numbers above to five numbers below the best indication. Use trial combinations to find which wheel is indicating. Use this information to begin the second graph. Find the gate center and use trial combinations to find the second gate. Run a third graph to find the remaining gate and complete the manipulation.

I have found that it is not uncommon to determine two gates in the first graphing sequence. They will commonly be the gates of wheels one and three. This means that only two graphing sequences are normally required to open these safes.

Because the push down lock is a manipulation resistant lock, be sure to charge appropriately for this manipulation. If you are a professional manipulator, you should be well paid for your services. Knowledge and procedures used in this manipulation should be considered confidential. Don't give it away. ■

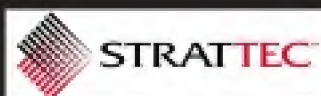
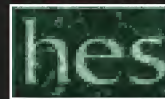
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The Preso-Matic Lock

"There are two basic types of Preso-Matic locks, the deadlatch and the deadbolt. Variations of the two designs have created nine different models."



Send your lock and key questions to Jack Roberts, The National Locksmith, 698 Bonded Parkway, Streamwood, IL 60107.

by Jack Roberts

Although there are many locksmiths who take a dim view of keyless locks due to the supposed loss of income as a result of not cutting keys there are others who believe that checks and balances keep things in place and that a minus can be replaced by a plus with good planning.

The market of any product is determined by our customers, the public, and it would seem that there must be a market of some kind out there for keyless locks since my research shows that there are at least 57 manufacturers of this type of device. This figure, of course, includes electronic, magnetic, card assess, and other designs that require some type of input from another source to complete the operation of the lock. If we break this list down to keyless, mechanical locks, the number of manufacturers becomes much smaller and can be further reduced if we count the manufacturers of keyless, or push button, mechanical

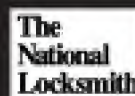
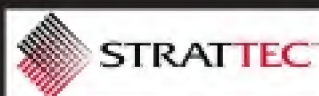
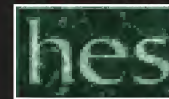
door locks. One of these, The Preso-Matic Lock Company, produces the device which we will examine in this article.

There are two basic types of Presto-Matic locks, the deadlatch and the deadbolt shown in photograph one. Variations of these two designs creates nine different models which pretty well covers any type of application that a customer may desire. The basic design, either deadlatch or deadbolt has a four number combination which provides 10,000 possible combinations. For additional security all models are available with a seven digit combination (designated 7D after the Model

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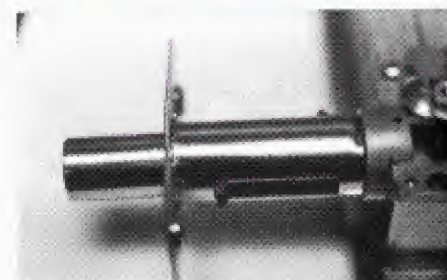


1. The Preso-Matic deadbolt.

No.) which increases the total available combinations to 10,000,000. A narrow stile model is presently under development and will possibly be available this year.

The basic model 8101 has a $\frac{3}{8}$ " throw hardened steel free turning deadbolt, locks manually, has a built-in night latch and is available with a $2\frac{3}{8}$ " or $2\frac{3}{4}$ " backset. The model LT8102 has a 1" throw deadbolt with the same features as the 8101 but has a 3" backset only. (See photograph 2.)

The night latch is set by pressing and turning the inside button which makes the combination pad on the outside



2. The model LT8102 with a 3" backset.

inoperable. Egress is obtained by turning the night latch button and pressing the interior unlock button which immediately retracts the bolt or latch. This feature may not be acceptable by code in some locations.

All models of the Preso-Matic retract the deadbolt or latch bolt when the last number is pressed. There are no knobs or levers to twist, turn or press; just enter the combo and the lock is open! Press the locking button on the inside or outside and the bolt or latch is thrown into the locked position.

The Model 8103 and 8103A are deadlatch locks with brass latches, while the model 8200 and 8200A have latches made of hardened steel. The "A" for each model designates "without nightlatch." All deadlatch models can be fitted with an *interior stay open plate* which is designed to keep the latch in an unlocked position for free ingress and egress when required. These plates are designated as 8 and 8A. Model 8 has a night latch, 8A does not.

Deadbolt and deadlatch models are available with double combinations. Which means they have a number pad on each side of the door, and are identified by the letters DC preceding the model number. The DC 9101 is a double combination deadbolt lock with a $\frac{3}{8}$ " bolt projection and $2\frac{3}{8}$ " backset. The DC 9102 LT has a 1" bolt and requires a 3" backset. The model DC 9200 is a double combination deadlatch with a $\frac{3}{8}$ " projection and 3" backset. All DC models come with tamper-resistant screws which require a special screwdriver, the TRS 49, which is necessary for installation and for changing of the combination slides.

All Preso-Matic Models using a four number combination can be mastered. The master combination is a six digit number and the individual combination is a four digit number. This is accomplished by cutting two combinations into each pair of slides which, of course, must be ordered from the factory but can be installed in the field. Master combination slides are design-



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nated as 8105M and if they are to be installed at the factory as 8105MIL. (All Presto-Matic models are furnished with stock combination numbers and there is no choice when ordering new slides for combination changing, except, four number combination slides can be special ordered to a customer selected combination and are designated as 8105S. Seven digit combinations are available from stock only.

So much for description, lets get into one of these and see what makes it tick (or is it lock?).

All Presto-Matic locks consist of three basic assemblies as shown in photograph three: the lock body, the bolt or latch and the inside cover plate. Various escutcheons are available in all finishes including black and while adding to the appearance of the installation, they also can cover some of the slips that may occur in prepping the door.



3. Presto-Matic lock body, the bolt/latch and inside coverplate.

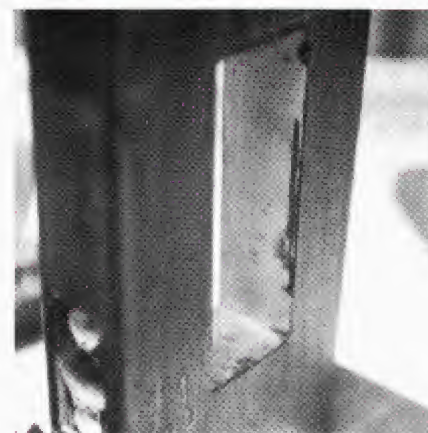
Presto-Matic locks are made to fit 1 1/4" doors (1-11/16" to 1-13/16" inclusive) and require spacer plates for doors less than 1-11/16" thick. Doors over 1-13/16" require a Presto-Matic No. 20 adaptor kit. These locks are not designed to fit into an existing prep for a key-in knob or deadbolt lock. The recommended placement of the lock is at eye level or four feet from the floor to the bottom of the lock. Dummy knobs or pull handles can be installed to cover existing KIK prep and provide a means of opening or closing the door.

If the Presto-Matic is to replace a deadbolt lock the DB prep will have to be covered by whatever means you may be able to figure. The instructions indicate that the average installation time is 15 minutes. I could take exception to this statement and ask at what point the timing is started. Maybe this time could be achieved after several installations and more experience but it took us that long to read and understand the instructions before we ever got started.

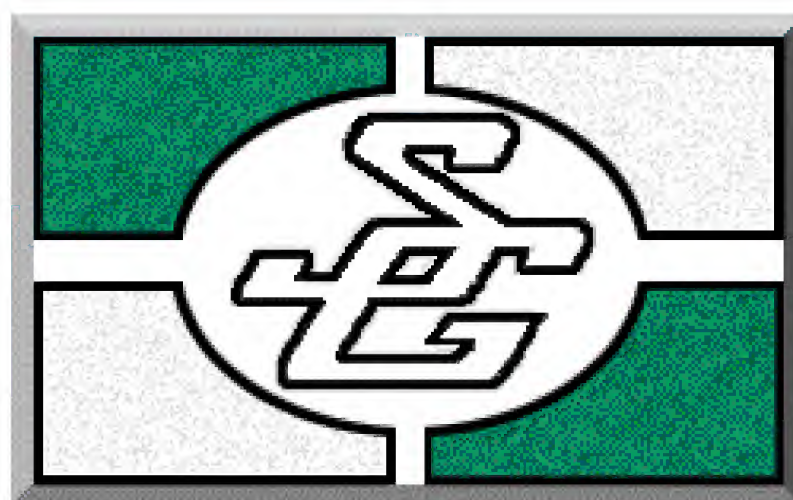
Use of the template provided is an absolute must. A rectangular cutout 1 1/4" by 5 3/8" is necessary. This can be

achieved by marking and boring 12 one inch holes, or four 3/4" and three 2" holes, and then use a chisel to square off the sides and form the rectangular shape. Another method would be to drill four 3/16" holes at each corner of the template and use a saber saw to make the cutout. (See photograph 4.)

Door prep for a deadbolt model is a bit hairy in that a groove must be routed in the bottom (or top, depending on the handing) of the 1" bolt hole to allow movement of the bolt lug when the bolt is activated. This groove must be 1/2" wide,

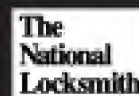
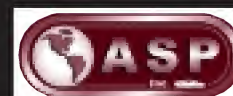
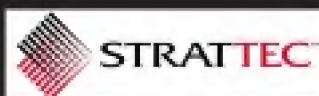
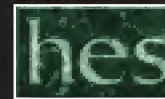


4. Saber saw cutout in door.



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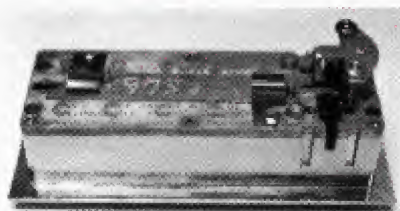
start at least $\frac{1}{4}$ " inside the hole and be on about a 45 degree angle. Care must be taken in cutting this groove so that there is enough material on the edge of the door to permit mortise for the face plate and installation of the face plate screws. We used just about all of our 15 minute installation time just in this one operation. The bolt lug *must* have free movement in this groove. The groove is not necessary when installing a dead-latch model.

When the bolt or latch is installed the lock body (see photograph 5) is placed in the cutout and the dovetail of the lock body and the bolt (latch) is engaged. This is a snug fit and care must be taken to insure engagement of both top and bottom dovetails. (See photograph 6.) When the lock body and the bolt (latch) are engaged the reset return spring (see photograph 7) is inserted and the holding screw, (see photograph 8) attached.

A brass holding pin is installed at the factory which holds the bolt in the locked position until final assembly. This pin must be removed before the lock will operate and must be inserted if the lock body is to be removed from the door. The instructions tell us to save this pin for future use. We promptly lost that little devil and discovered its purpose is to hold the bolt assembly together until installation is complete. This pin's purpose can be seen looking back at photograph six which shows a holding pin made of round spring stock. With the holding pin removed the back plate is put into position with the unlock button entering the hole of the reset plate and the back plate reset lever behind the plate. There is a three hole adjustment for the backplate reset lever to provide proper operation for doors of various thickness.

Combination changes are relatively easy and can be accomplished without removing the unit from the door. The back plate is removed which exposes the rear of the lock body. The combination slide cover plate is removed by turning the two holding tabs 90 degrees and lifting the plate from the two set pins. The slides (often referred to as combs) are lifted from their cavity and replaced with new slides. (See photograph 9.)

All combination slides have the number stamped on them and must be installed in pairs. Replace the slide cover, check the operation of the unit, and replace the back plate and the combination change is complete.



5. Lock body. Note holding pin.



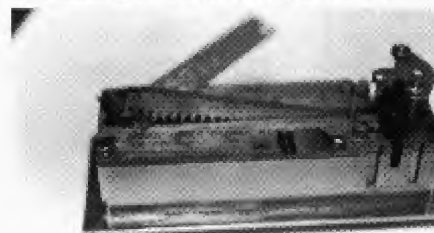
6. Top and bottom dovetails must engage as shown.



7. Reset return spring.



8. Holding screw properly attached.



9. Combs being lifted to change the combination of the lock.

For installation on non-reinforced steel doors spacer clips are necessary at each corner of the rectangular cut-out. Insulation material in the area of the installation must be removed to insure unobstructed movement of the dead-bolt lug.

The Preso-Matic is a well built unit that can meet the demands of many users who desire keyless operation. To keep the old key machine running, however, a keyed cylinder bypass may be added with the use of the bypass adaptor. These cylinders can be mastered in the usual manner to create an even higher level of security. For more information contact: Preso-Matic Lock Co. Inc., 3048 Industrial 33rd St. Ft. Pierce, FL 34950, (407) 465-7400. ■



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Servicing Master Ring Cylinders

"The master ring cylinder uses the principle of a plug within a plug. This principle eliminates the phantom keys that can normally occur."



In our June 1986 issue we discussed the method of servicing Corbin and Russwin master ring cylinders. Since then, requests for a more in-depth treatment of these lock cylinders, especially servicing them by using a standard pin kit rather than the factory kits, have been coming in. This article will review a portion of the information

from the original article while concentrating on the use of standardized pinning kits.

The master ring cylinder uses the principle of a "plug within a plug," as shown in illustration one (a). Regular operating keys turn the plug only (b) while the master key(s) turn the master

ring with the plug (c).

This principle eliminates the "phantom keys" (which ALOA refers to as "incidental masters") that normally occur between the master key and change key cuts.

For example, if you pinned a standard 6 pin lock cylinder to a master key and change key, with one master pin in each of the six chambers, there would be sixty-four keys capable of operating it...the two you wanted to and sixty-two others that, if created, would be capable of doing so.

In the master ring cylinder, on the other hand, lining one chamber up at the operating (or change key) shear-line, and the others at the master ring

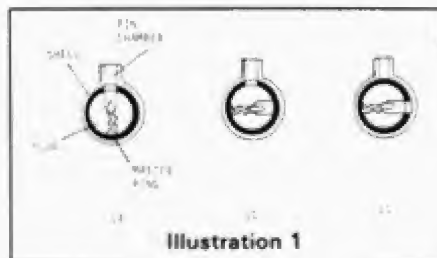


Illustration 1

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shearline, accomplishes nothing. The lock remains locked. So instead of the sixty-two extra keys being capable of operating it, *only* the two authorized keys can. There are *no* phantom keys for this cylinder.

If we add a second master key (differing from the master we already had by one position) there still are no phantom keys created. If we then add yet another level of master key (setting up a great-grand master key system), we end up with one phantom key. Adding a fourth master key level (to a great-great grand master key system), we have only four "phantom keys" possible. As you can see, this results in a much more secure cylinder after masterkeying it, as compared with a standard cylinder.

Pinning these cylinders can seem a little confusing at first, but you will find it very easy if you follow these simple steps.

First, we will select the bottom pins. This is done by using the exact cut numbers from the change keys. A key of 543233 bitting, for example, would use a set of bottom pins of: 5 4 3 2 3 3. To determine the exact pin lengths involved, use the following chart (see *illustration 2*).

	BOTTOM PINS									
	1	2	3	4	5	6	7	8	9	0
CORBIN X	217	231	245	259	273	287	301	315	329	343
CORBIN Z	203	217	231	245	259	273	287	301	315	329
RUSSWIN D,H	203	217	231	245	259	273	287	301	315	329
SYSTEM 70	203	231	259	287	315	343				

Illustration 2

	BUILD-UP PINS																	
	-8	-7	-6	-5	-4	-3	-2	-1	0	1	2	3	4	5	6	7	8	9
CORBIN X,Z	023	037	051	065	079	093	107	121	135	149	163	177	191	205	219	233	247	261
RUSSWIN D,H																		
SYSTEM 70																		

Illustration 3

	MASTER PINS								
	1	2	3	4	5	6	7	8	9
CORBIN X,Z									
RUSSWIN D,H		028	042	056	070	084	098	112	126
SYSTEM 70	028	056	084	112	140				

Illustration 4

For the build-up pins (to reach the master ring shearline) we calculate the difference between the change key cut for each position and the lowest of the

master key cuts for that position. If we had a master key cut of 5, a grand master key cut of 3, and a change key cut of 1 for a particular position, for

Continued on page 103

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Humor:

A Locksmith Buys A Lincoln

"Nobody wants to drive this to work and have their boss see them. The boss would figure that he is paying too much, or that they are embezzling, or selling dope."

by Joseph Locke

I was very happy with my little Horizon. I could park it anywhere and know that it would still be there when I got back. It would eat up narrow parking spaces, and there was always room in the garage to put a few semi-repaired safes.

No more.

One of the banks that I service has a repossession lot, and while making four different keys for a '67 Jaguar, I noticed a robin's egg blue Lincoln sitting in the main garage.

"What's with the Lincoln?" I asked one of the bank lot employees.

"The owner got a divorce right after he bought the car, and he just drove it from the car lot to the bank lot and

turned in the keys!"

"Wow!" I thought to myself. "That will bring a pretty penny!"

Several weeks lapsed and I had to go back to the lot to make keys for a BMW (which is an article all by itself) and the Lincoln was still in the same spot.

"Why hasn't somebody snapped this up?" I asked.

The bank repo manager sighed, "Nobody wants to drive this to work and have their boss see them. The boss would figure that he is paying them too much, or they are embezzling, or worse yet, selling dope on the side."

Being my own boss (wife notwithstanding) I decided it was worth a shot, so I submitted a ridiculously low bid

for the car.

The repo manager laughed when he saw my bid.

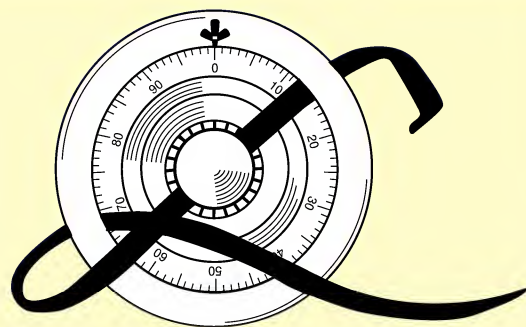
"You have got to be kidding!" he chuckled. "The original buyer paid more than that for the dealer prep!"

I ignored these petty insults and proceeded to break the tip of a BMW key off in the ignition while trying to impression (but that is another article).

A month later, it was vacation time and I was all set to drive to Boston through Canada for my vacation when the bank called.

"Your bid was accepted," the bank manager said. "Don't blame me for what happens!"

"What do you mean...what happens?" I asked.



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"You'll see, you'll see..." he said with a melancholy tone. I seemed to hear a church bell toll in the distance as he hung up the phone.

The first thing that bothered me about the car was applying for the loan. The bank that had been using my money for years all of a sudden never heard of me or my credit-rating. The lady in charge of the loan department scowled the whole time we were signing the papers. She told my wife later that she always wanted a car like that, and wondered how he got it so cheap.

I laughed off that incident, and called my insurance agent to get coverage for it.

"Boy, I must be in the wrong business!" he said in disgust.

Ignoring my agent was easy, because he always managed to ignore my insurance claims.

Our daughter came home from school after we had dropped her off in the Lincoln that morning. "A friend of mine wanted to know why my grandparents dropped me off today," she muttered.

We decided to leave our troubles behind us and take off for our vacation.

Everything went well 'til we hit the Canadian border, and boy did I get a

suspicious look from the border guard. She wanted to know my family tree back to Cheetah, and just what in the world would a punk like me be doing driving a Lincoln. Lucky for me I had a "Just Say No" bumper sticker, or I would have had to spend all day watching my new car being systematically searched and scratched.

Toronto was an interesting town, but it has one major flaw...the pedestrians have the right-of-way. In Toledo we have "Run...Don't Run" crossing lights, and God help the pedestrian who thinks anyone cares how much his hospital bill will be.

My Lincoln has a short wheelbase compared to the older models of big luxury cars, but the front end is just as long. That means when you turn it swings around alot faster than you expect, and there is a businessman in Toronto still trying to remember the last two numbers of my license plate (He needed a new pair of pants anyway).

The American border guard was even more suspicious than the Canadians, and we had to declare everything including the fact that he looked good in blue! He asked what I did for a living, and I said, "I'm a locksmith."

For some reason that did not seem to make him any less suspicious. It tends to make one rethink his labor charges.

I stayed in Boston just long enough to get sick of my relatives and the traffic, and that was about an hour.

After returning home, some of my locksmith friends found out about the car, and did they ever lay on the insults.

"Who are you trying to impress?" one sneered.

"Now I'll have to buy a Mercedes!" another moaned.

My neighbors were not too thrilled about it either, but I kind of enjoyed bugging everybody. Then the axe fell. Both of my trucks broke down at the same time, and I had to let a guy into his apartment right away. He watched me as I drove up, and rubbed his eyes as he saw me touch the keyless entry buttons to open the truck to get my tools. I picked the lock in about 3 seconds, and said, "That'll be 50 bucks (night call, and besides, I'm greedy)."

He shook his head, and said, "Boy, I must be in the wrong business!"

I think I am going to trade this monster in and get a pick-up truck, with rust everywhere and a bumper sticker that reads "Kiss A Locksmith." Then everybody will love me. Maybe. ■



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Opening Simplex Locks

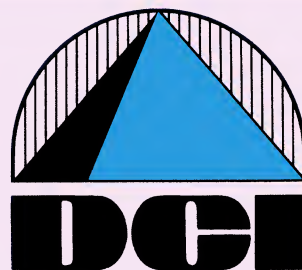
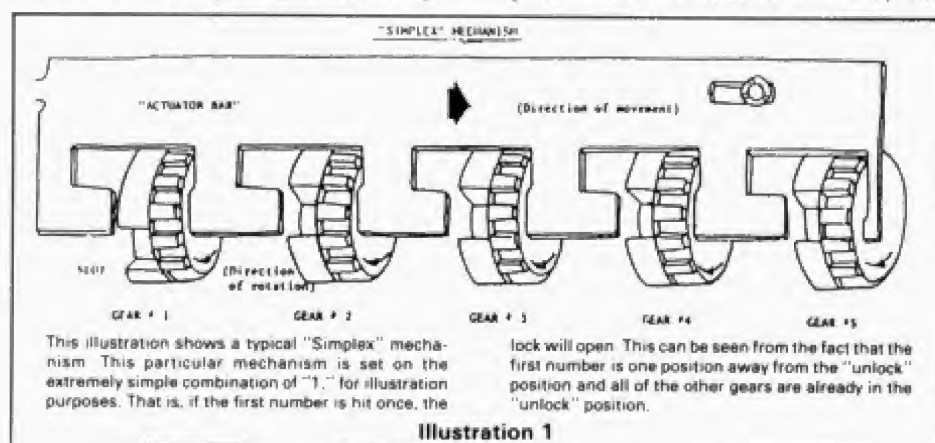
"The 'picking' procedure described below requires an understanding of the basic principles of the Simplex mechanism. Then we derive information about the combination."

The Simplex lock mechanism is the heart of several door control devices, such as those sold by the Simplex Lock Company, Security Hardware and Emerson Electric. The "picking" procedure described below requires an understanding of the basic operating principles of the Simplex mechanism. Once we understand what it is that we are "feeling," we can apply simple tests to derive information about the combination.

We must then go back to the sheet of combinations and try the ones that have not been eliminated by our tests. With a little practice you can overcome

the initial confusion as to exactly what your results mean, and "pick" this mechanism with speed and reliability.

The "feel" necessary for the tests is much less critical than that required to pick more conventional locks, but



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should be practiced to improve reliability.

The basic mechanism, which is the heart of all these devices, contains five gears which rotate around a common axle. (See illustration 1.) Each gear is rotated one position when its pushbutton is pushed by the operator. Once a gear has been rotated by its pushbutton, it will continue to rotate when any subsequent pushbutton is pushed. However, once a pushbutton is pushed, it no longer has any effect on any gear.

To illustrate, if pushbutton number 3 is pushed, it causes gear number 3 to rotate one position. Now, if pushbutton number 2 is pushed, both gear number 2 and gear number 3 will rotate one position. If pushbutton number 3 was now pushed again, it would not cause any gear to rotate at all.

There is a slot in each of the gears. (See illustration 1.) When all of the gears have rotated various amounts from zero rotation to five positions rotation (according to what combination has been set), all of their slots will be lined up in the "unlock" position. (In illustration one, gears 2, 3, 4, and 5 are in the "unlock" position so they do not have to rotate. However, gear number 1 is one position away from the "unlock" position.

Once all of these slots are aligned in the "unlock" position, the actuator bar can move into the slots, thus allowing the lock to open. The actuator bar is moved in this direction by rotating the control knob on the lock in a clockwise direction. When this knob is rotated in a counterclockwise direction, all of the gears are reset to their starting positions.

Chart two (see page 80) of the possible combinations is arranged in order of ease of operation. It is suggested that the chart be followed in order, going down one column at a time, left to right, thus leaving the least likely combinations for last.

Picking Procedure.

There is a "lead" pushbutton on each lock. This is the pushbutton associated with the gear that is slightly closer to the actuator bar than the others. (Those familiar with picking procedures know that it is impossible, on a commercial basis, to have perfect alignment. It is this fact that is the basis for the "feel" method of picking of conventional locks.)

When the control knob is rotated in a clockwise direction, the actuator bar will contact this pushbutton's gear first.



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Procedure.

1) **Determine which button is the 'lead' button.** Lightly depress each of the pushbuttons until some resistance is felt (approximately 1/16th of an inch). This is before the point at which they actually click the mechanism. Now, apply substantial pressure on the control knob in the clockwise direction and depress each button to the point that pressure is felt again. Four of the pushbuttons will depress the same amount as they did before pressure was applied to the control knob.

One of the pushbuttons however will only depress approximately half of the distance previously found. This button is the lead pushbutton. If pencil lines are lightly scribed on the pushbutton, it will make this observation even easier.

2) **Determine if the "lead" pushbutton is in the combination.** Apply substantial pressure on the control knob in a clockwise direction and try to force the lead button to fully depress to the point that it "clicks" the mechanism. Then try to similarly force the other buttons. All of the non-lead buttons will be able to be forced past the pressure and will click. If the "lead" pushbutton can also be forced down, it is not in the combination. This is because

the actuator bar will slightly enter the "lead" gear's slot, thus positively preventing the button from being forced down if this slot is in the zero position. (Which it is when it is not in the combination.)

3) **If the "lead" pushbutton is not in the combination** we have already reduced the number of possible combinations from 1080 to less than 150 combinations. The way to select the remaining possible combinations from the list is to select only those combinations which have the eliminated button as the last number or as part of the last number. We can now try each of these combinations, except we drop the last number (or group of numbers) since we know it cannot be in the combination. (Example: If we determine that #1 is not in the combination then the first number we will try in the first column will be "2 3 4 5".)

4) **If the "lead" pushbutton is in the combination** we should then attempt to learn information about the relative position of this button with respect to the other buttons.

Depress the lead pushbutton completely so that it clicks and use the test from section "A" to determine if a new lead button has emerged. (Note: Use

substantial pressure on the control knob to eliminate erroneous readings but do not press so hard as to jamb the mechanism.)

If a new lead pushbutton is discovered after the original lead pushbutton was actuated, then we know that the original lead pushbutton was either the last number or part of the last number of the combination. We know this since, when we hit this button once, its slot was aligned with the actuator bar. This meant that the actuator bar was no longer hitting the original lead gear first. The bar was now hitting the next highest gear, thus making a new lead gear. Since the original lead pushbutton had to be hit only once before its slot was aligned with the actuator bar, it must be the last (or part of the last) number in the combination.

If no new lead button is discovered then the lead gear is more than one position away from actuation alignment. To test to see if the lead gear is two positions away from actuation you can try several things. Hit the lead pushbutton so it clicks. Hit in another button and make a note of which one. Now, if the lead button was two positions out, you would now have rotated it so it aligns with the actuator bar. This



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means that the actuator bar will enter the slot in the lead gear and no longer come in contact with the lead gear itself.

Test the other three buttons not yet hit in to see if their travel has been lessened as described in the test for a lead pushbutton (See procedure #1). If a new lead is discovered, then the original lead button was two positions away from actuation, which means that it is (or is part of) the next to last number of the combination. Mark down all of your findings on a chart, such as the one shown in illustration three.

Now use a similar testing procedure to determine the position of this new lead pushbutton. (Note: We are trying to determine two pieces of information about the relative positions of these numbers since it was our experience that this so drastically reduced the possible combinations that attempting to ascertain further information used more time than it saved.)

If a new lead pushbutton is not found, repeat the previously mentioned procedure with all other variations of the buttons to see if the lead button was the next to last number in the combination. It should be noted that it is necessary to check out all possible variations before going on to the next level of

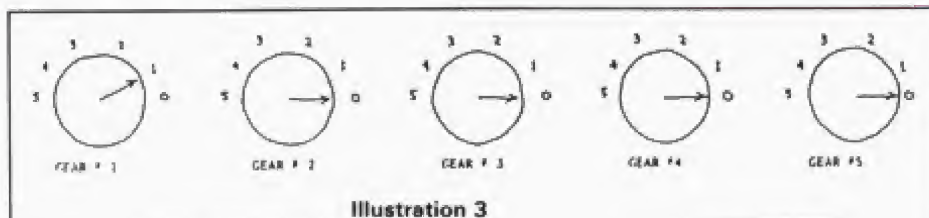


Illustration 3

testing. This is a very fast test.

By using this type of logic, and with a simple chart, we can find the position of the lead pushbutton in the combination and the relative position of the second lead pushbutton with respect to the first.

As mentioned it is our objective to obtain two pieces of information about the combination and then to mark our chart and try the few remaining eligible combinations. If, however, the lead pushbutton is found to be either four or five rotations out at the actuation position, this alone is enough information to eliminate most of the combinations.

With a little practice, an average manipulator should be able to open various random combinations in less than fifteen minutes. The more simple combinations will fall out even faster. As with picking, it must be stressed that performance will be greatly improved by practice. ■

Chart 2

Chart of Possible Combinations

Note: Grouped numbers indicate a simultaneous hit. A bar (-) is an indication to rotate the control knob in a clockwise direction. After each combination rotate the control knob in a counterclockwise direction to clear the mechanism. Example:

2 34 5-1-

(A) Push #2; (B) Push #'s 3 and 4 simultaneously; (C) Push #5 and rotate control knob clockwise; (D) Push #1 and rotate control knob clockwise.

To use the following chart start with the combinations in column 1 and proceed down each column in order. This way you will progress through each of the possible combinations in an orderly fashion.



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"The key to manage the forces of change lies in the willingness of the shop owner to invest his time in proper educational programs which are crucial."

by Sean DeForrest

This is part IV in a series of articles on managing your business for more profit. The series began in the June issue of The National Locksmith, and has been featured monthly since then. The emphasis this month is on the current crisis in education.

My last three articles have described the current challenges that are facing the locksmith industry. These forces of change are affecting the business owner in many broad areas from designing successful marketing strategies to analyzing financial statements. The key to successfully managing these changes lies in the willingness of the lockshop

owner to invest his (or his employees') time in the proper educational and training programs which are crucial if his business is to continue to grow and be successful. But where can the lockshop owner find these training programs? The answer to this question (which is very few places) points to the reason we currently have a crisis in education in the locksmith industry.

There are five traditional sources that managers can utilize to obtain job training: on-the job training, trade associations, vendors/suppliers, colleges/universities, and consultants. Let us examine these five areas and review how they are currently address-

ing today's specialized educational requirements.

First, on-the-job training has been almost totally dedicated to product/service instruction at the locksmithing business. The reasons for this are quite obvious. Until lockshop owners obtain necessary management skills themselves, they will be unable to pass these skills on to their key employees. (We are not even addressing the problem of whether or not they would be willing to pass these skills on to key employees.)

The solution to this is also obvious, though not necessarily desirable, hire key employees who already have these skills. The problem with this approach



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is that such employees could lack the technical skills (i.e. locksmith knowledge) needed for them to be immediately productive; and, in addition, they would command higher wages than are traditionally paid by lockshop owners. However, if a locksmith is willing to invest the time and money necessary, "muscle building" his company by hiring outside talent can be a successful long-term strategy for his business.

The second source for job training is trade associations. The function for any trade association can be three-fold: 1) To educate its members. 2) To exchange information between members, and 3) to advance the political objectives of its members. The national locksmith association, ALOA, has primarily focused on developing members' technical skills. In addition, ALOA must cater to the needs and wants of the majority of its members. Unfortunately for the small percentage of larger locksmith businesses, the majority of locksmith owners are not primarily concerned with adding managerial skills or financial education. Instead, they place much more emphasis, as they should,

on further advancing their product and service knowledge. This need is not lost on ALOA. Although they make attempts at broadening their educational space, most educational emphasis is on technical classes.

The small minority of lockshops that seek specialized education must rely on local associations for any trade association help. There are a number of very successful local organizations that do address these needs. However, these are the exception and not the rule at the local level.

The third source of training available to locksmiths is vendors and suppliers. While a handful of vendors supply product training to locksmiths, the majority of manufacturers do not provide formal educational programs. For large lock manufacturers, the locksmith industry remains a relatively small portion of their business and does not command a great deal of their time or attention.

Locksmith distributors, on the other hand, have a great deal at stake in educating their customers. The more training distributors can offer locksmith businesses, the more long-term business this guarantees the distributor. To

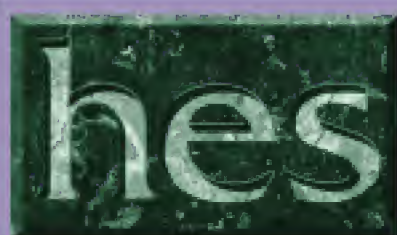
date, distributors have been reluctant to invest time and money in training programs because they have been unable to successfully market this concept to the right target customers. However, those distributors who eventually find the right marketing program will have a distinct advantage over their competition by offering a unique value added service. (See August's article, Part III.)

Universities and colleges represent the next area that can provide education to lockshop owners. This represents one of the two best sources for managerial, financial, and market training. Adult education programs generally are inexpensive and are geared for people who work during the day.

The second best source for specialized training comes from consultants. Unlike adult education programs, consultants are usually much more expensive. However, they offer the opportunity for more indepth training and a wider variety of services than are available from local colleges.

You can choose from two types of consulting services. First, those that "contract" with you to provide a spe-

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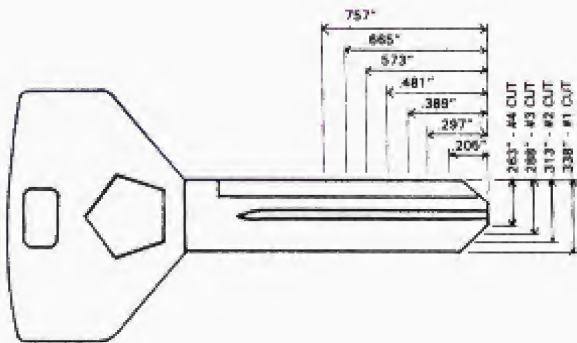
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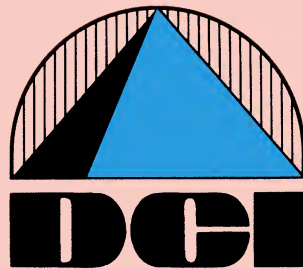
Depths shown are different from those shown in the August issue. The depths printed here are the correct ones to use. This is a double sided key.

DEPTHS

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- 2 - .313
- 3 - .288
- 4 - .263

KEYWAYS

- B & S 594145 (Master)
- B & S 321566 (Valet)



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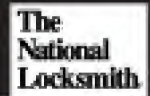
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Taylor

Ilco

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 Taylor
 Ilco

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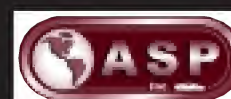
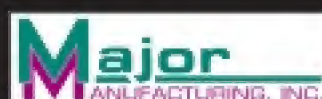
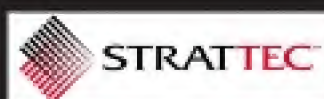
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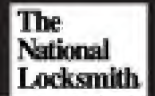
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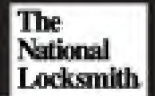
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09	3443213	3443211

1250

Master Valet

50	1243232	1243234
51	2133313	2133311
52	2321121	2321123
53	3432321	3432323
54	4424342	4424344
55	4433213	4433211
56	2243223	2243221
57	2242232	2242234
58	3432213	3432211
59	2324311	2324313


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Keyblanks:
 HPC/Silca
 Taylor
 Ilco

1260

60	4321344	4321342
61	4421313	4421311
62	2232132	2232134
63	1113213	1113211
64	3132313	3132311
65	4334213	4334211
66	4213121	4213123
67	2231342	2231344
68	3313344	3313342
69	4244211	4244213

70	1324323	1324321
71	3424422	3424424
72	2133422	2133424
73	4231124	4231122
74	3332242	3332244
75	3132133	3132131
76	4342334	4342332
77	4424234	4424232
78	1131213	1131211
79	1331211	1331213

80	3121134	3121132
81	1313321	1313323
82	4212313	4212311
83	3423124	3423122
84	3432432	3432434
85	3342434	3342432
86	2321342	2321344
87	3321133	3321131
88	1113123	1113121
89	3244421	3244423

90	3331344	3331342
91	1242133	1242131
92	4332132	4332134
93	4324311	4324313
94	4333134	4333132
95	4213213	4213211
96	4221223	4221221
97	1121242	1121244
98	3331211	3331213
99	3444223	3444221

1300

Master Valet

00	4233234	4233232
01	3324342	3324344
02	2323122	2323124
03	2111313	2111311
04	1311232	1311234
05	1131342	1131344
06	2323213	2323211
07	3342233	3342231
08	4323434	4323432
09	3312311	3312313

10	1334242	1334244
11	4224322	4224324
12	3331124	3331122
13	2224342	2224344
14	4443131	4443133
15	1224311	1224313
16	4343121	4343123
17	3224424	3224422
18	3432344	3432342
19	1133231	1133233

20	3242311	3242313
21	4231342	4231344
22	2433213	2433211
23	4232223	4232221
24	1234342	1234344
25	4443242	4443244
26	1342123	1342121
27	1321233	1321231
28	3334424	3334422
29	2112321	2112323

30	1231313	1231311
31	3331231	3331233
32	1234233	1234231
33	2321234	2321232
34	3432124	3432122
35	1324342	1324344
36	1343244	1343242
37	1221342	1221344
38	4242234	4242232
39	3111234	3111232

40	4221244	4221242
41	3444244	3444242
42	1213131	1213133
43	4242321	4242323
44	2422344	2422342
45	3234323	3234321
46	1244421	1244423
47	2232311	2232313
48	3122323	3122321
49	3112134	3112132

1350

Master Valet

50	4233122	4233124
51	4433342	4433344
52	4344311	4344313
53	3434323	3434321
54	3243431	3243433
55	2431342	2431344
56	1121131	1121133
57	1342232	1342234
58	2322424	2322422
59	4312344	4312342

60	2431123	2431121
61	4233323	4233321
62	2113422	2113424
63	3434213	3434211
64	2131133	2131131
65	4432131	4432133
66	4312433	4312431
67	4344421	4344423
68	4424324	4424322
69	3131231	3131233

70	1213424	1213422
71	4312123	4312121
72	3133231	3133233
73	4343213	4343211
74	2311332	2311334
75	4232132	4232134
76	3113342	3113344
77	4213344	4213342
78	2223134	2223132
79	2432244	2432242

80	2213213	2213211
81	1233133	1233131
82	4334233	4334231
83	1311211	1311213
84	1133213	1133211
85	1132313	1132311
86	2331242	2331244
87	2423334	2423332
88	3113122	3113124
89	3421123	3421121

90	3234234	3234232
91	2242133	2242131
92	4233344	4233342
93	4331234	4331232
94	1224424	1224422



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Shop Talk

Helpful Questions and Answers

Written by *all* of the following authors: Shirl Schamp, Jack Roberts, Dave McOmie, Steve Spiwak, Don O'Shall, and Robert Sieveking.

Send your locksmith questions, along with a self-addressed stamped envelope to: Shop Talk, The National Locksmith, 698 Bonded Pkwy., Streamwood, IL 60107.

Q: I am wondering if you would consider doing an article in the near future on the subject of key manipulation, using a key like a pick—running it in and out of the cylinder in order to defeat the lock. I first heard about this in a master keying class.

I was taught that when changing combinations to make sure there was a three to five pin difference between the old and new. I recently changed a combination (Schlage C) from 57468 to 35346 (a five pin difference). I inserted the old key (57468) to make sure it would not work. It didn't, until the customer was trying it in the lock! The old key (57468) as it was being withdrawn from the lock the pins rode up the slopes of the key and lining all the pins at the 35346 shear line, thus opening the lock. I found this out after I took the lock apart. Fortunately I had both keys.

Now I am wondering since I change a lot of locks where the old key is not available, how am I suppose to know if the old key could be manipulated to work? I am sure that many locksmiths are not aware of this problem. Please help if you can.

Robert Williams
California

A: This isn't going to be a very popular answer, I am afraid. Key manipulation is a very real security threat, not only to master keyed cylinders, but to every standard pin tumbler lock cylinder ever made.

My first experience with key manip-

ulation came fairly late in my career. I was called in as a consultant on a master keying job by a graduate of one of my courses. The lock cylinders were Russwin D41 keyway in heavy duty knobs and mortise cylinders. The job was at a reform school, and they had a real problem going into the job. A resident of the school was using his room key to "pick" virtually every lock cylinder in the place.

Examining the cylinders, several problems were apparent. One was that the old "masterkey system" had been set up poorly, and contained many interchangeables by itself. Another was that the system had been maintained by what passed for a locksmith but was in reality a fairly competent boiler repairman, on which qualifications he had been hired. Over the years he had filed the plugs to "fit" the pins until each plug had approximately a twenty-three thousandths of an inch flat on it. The system, despite its previous number of problems, was fairly small—less than sixty locks on a six pin cylinder.

The first step was to set up a system and carefully select the combinations to use from among them. Since there was virtually no chance of expansion in the system due to space limitations on the facility itself, we could afford to be very picky in selecting the bittings used.

I selected bittings whose pinning, when calculated on a keying pinning calculator program, had bottom pins of highly varied patterns, such as 6, 1, 7, 3, 8, 2 and total master stacks that were not straight (such as a total of master and bottom pins adding to a pattern of 8,7,7,8,8,6), nor were too similar from cylinder to cylinder.

I then pinned the cylinders, using newly purchased plugs that had never been filed throughout the system. I also replaced all of the drivers, using "spool" or "mushroom" drivers in every chamber.

My last step reflected the basic paranoia that is a part of my basic being ever since I first heard of "Murphy's

Law"...I gave myself three minutes to pick each cylinder in the system. I am no slouch when it comes to picking, but I only retired two of the cylinders in the system for failing this last test.

Finally, satisfied that no one could find fault with such a professional system, we returned to the jobsite and installed the replacement cylinders. My former student had too much faith in my abilities, and too little in "Murphy's Law" and the existence of "Glitches", however, and bragged, "That fellow won't open these locks by using his key." The kid then proceeded to take his newly issued key, and, in under thirty seconds each, to open every lock in the establishment before our astonished eyes.

To make a long story short, we ended up converting all of the cylinders in the job to high security cylinders, (which fortunately the person in charge was willing to pay for) to get the security needed.

Three weeks later, he called up to say that a gift of appreciation was on its way, and that during the last few weeks the kid had tried almost constantly to beat the system, and finally, in desperation and anger, had begun to violate the cylinders by the introduction of peanut butter and wax into the keyway, so that at least nobody else could open them either! Our customer thought that was great, even though he needed to order some new cylinders.

All this made me feel pretty confident about high security lock cylinders, and I sold a lot of systems during the next couple of years including them. And then one day, I watched a security guard who, by rights of usage within the system, should have been issued a top level master key, but instead carried a ring of keys. All of the locks in the system were high security cylinders. Rather than searching among close to thirty keys on his ring, he would insert one and work it in and out of the lock very rapidly, while applying turning pressure. It opened most of the locks in his path!

Continued on page 100



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It should be noted that this is not an affliction solely affecting masterkeying cylinders, either, although they are slightly more prone to be susceptible to it. A factory keyed-different cylinder can be opened by the same technique in only slightly more time. A cylinder with greater tolerances at the shearline is more susceptible to it than a cylinder whose keyway is tight, of course.

But when it comes right down to it, virtually any cylinder *could* be opened by this method, given enough persistence.

The problem is that even a key inserted slowly into the lock, if it uses a 90 degree cutter of standard thickness, will leave slopes between the cuts that can hit hundreds of combinations along its path.

A key rocked, (keyway tolerances permitting), can create a multiplier to increase this at least a hundred times the original. And a key rapidly inserted and removed, can duplicate the action of a rake and a rocker pick combined, effecting thousands more combinations.

Is all of this a major security threat? Apparently not, for the number of incidents of criminal key manipulation is understandably low, since its effectiveness increases as patterns of similarity exist among the locks, such as those within a masterkey system.

Indeed, most of the successful key manipulation attempts I have even heard of are among the "authorized users" of the system, trying their keys in other cylinders "for fun" or "to check it out."

Is it a legitimate concern? Yes, as is every security question any locksmith can voice. But, given today's limitations on technology, any lock cylinder can eventually be beat. In the meantime, use good quality cylinders with tight tolerances. Use proper pinning techniques and masterkey selection. Use every weapon you have in your arsenal to protect the public at large, and then, in a realization of the fact that you are only human, accept when all of your efforts are not enough, and correct the situation as well as you can.

In the example you gave, the pattern of odds and evens was highly similar between the two keys, and the differences were a straight one or two increments.

This opens up the biggest argument ever for varying the progression patterns and using other than a standard two increment drop on masterkeying, as well as avoiding the use of only one

Maybe none of these ideas will work for others, but they certainly seem to have worked for me. I would urge others to try them out to see if there isn't a happy change in the way people view you as an individual and also our profession as a whole.

Merle Hyldahl
New York

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or two patterns of odd and even cuts, but instead making use of the entire 26 acceptable patterns of odds and evens in a two increment drop system with depths of zero to nine.

Key manipulation, like picking by any other means, exists. But it is most often limited to keys that are similar in some aspects, so we strive to avoid similarity whenever possible. It cannot always be done, but as in any other endeavor, the only way to fight it is to try.

05

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Letters

Continued from page 6

other such ruse to keep from paying me on the spot. I even tell people that they may send me a check if it is more convenient.

I do use one "trick" if you could call it that. If a person asks me, "Will you take a check?", I always counter with the same statement, "You trusted me to come into your home and work on your security hardware. Of course I can trust you!" While that is a positive statement, it probably makes them think a bit about honesty and ethical behavior.

There *are* however, several good rules that everyone should follow in making a business contract, either verbal or otherwise:

1. Make *sure* the customer knows in advance approximately what the job is going to cost him.

2. If the customer requests some other service in addition to the original verbal agreement, make *sure* he knows that there will be an additional charge, and how much it will be.

3. Make *sure* you project the proper image—one that will earn you the respect due to any ethical business person. How much differently people treat you if you arrive at the job dressed in a clean, neatly pressed pair of slacks, a clean sport shirt, and a pair of polished leisure shoes, rather than in a "T" shirt, sloppy jeans and dirty Rebocks. If the environment seems to require it, it even helps to slip on a tie and a sport jacket, particularly if the decision makers will be dressed similarly.

Continued on following page

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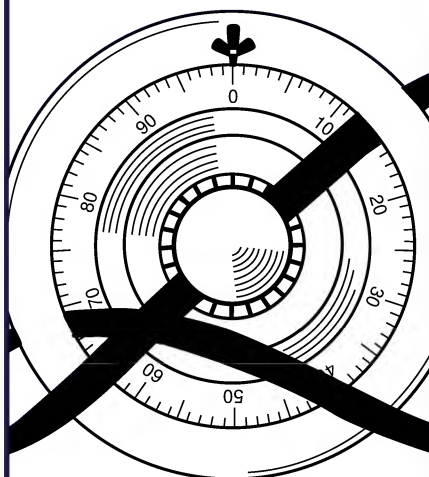
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Master Ring Pinning

Continued from page 68

example, we would compare the change key cut (1) with the number 3 master key cut, because the 3 is a lower number than the 5. This would give us a difference of 2. Because the change key cut is smaller than the lowest master cut, this is a "PLUS" pin (which could be written either as 2 or as +2). If the cuts had been reversed, so that the change key used the 3 and the master used a 1, the difference would still have been two, but now it would be called a MINUS pin (written as -2).

If the two cuts had been the same (both a number 3, for example) the difference between them would be zero. Note that this *does not* mean that no build-up pin is necessary, only that a number zero (0) build-up pin is needed. The following chart shows the build-up pin lengths (*see illustration 3*).

Next we calculate the master pins to allow more than one master key level to operate the master ring shearline. This is done by simply calculating the difference between cuts on the two master keys. The difference between a 5 master key cut and a 3 grand master key cut would be two increments. The following chart shows master pin lengths for these. (*See illustration 4*.)

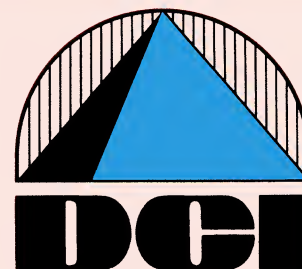
And finally, we choose our driver's based on the type of cylinder involved. Key-in-knob cylinders use a .099 driver, mortise cylinders a .172 driver, and jumbo cylinder a .240 driver.

As an example of all this, let's calculate the pins for a Corbin Z series key using depth cuts numbered 1 to 0, in a jumbo cylinder.

GMK	5	2	1	2	4	5
MK	3	2	1	2	4	5
CK	3	4	5	4	2	3
BP	3	4	5	4	2	3
	=231/245/259/245/217/231					
BUILD-UP	0	-2	-4	-2	2	2
	=135/107/079/107/163/163					
MP	2	-	-	-	-	-
	=028/ / / / /					
DRIVERS	(JUMBO)					
	=240/240/240/240/240/240					

All of the figures listed for bottom pins in illustration two are for use with the .552 diameter plug, as opposed to the .503". If the plug diameter were .503" the bottom pins would be approximately .049" shorter. Every master ring cylinder that I have seen or worked on used a .552 plug, however.

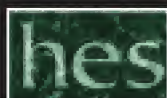
As you can see, working on these



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with the proper information is fairly simple. These locks are very common on large master-keyed complexes, such as schools and universities or large office buildings. The World Trade Center in New York City, for example, relies on these to handle its security. Using only one keyway and a two increment drop, this cylinder yields 15,624 possible combinations. Adding sectional keyway use to it (which ALOA refers to as a "Multiplex" system) allows it to be expanded much farther, especially if restricted keyways are used.

Learning to work with these is a must for the professional locksmith. ■

Simplex Picking

Continued from page 86

Col. 20
1235-4-
4 1235-
1245-3-
3 1245-
1345-2-
2 1345-
2345-1-
1 2345-

Managing For Profit

Continued from page 88

cific type of training for a specific period of time. The disadvantage with this choice is that there are hundreds of consulting firms available ranging from charlatans to Fortune 500 advisors. A more conservative alternative is to select an advisor, usually a CPA or banker, who becomes a part-time member of your management team. Chosen carefully, this person can be an invaluable contributor of ideas as well as an "on the job" trainer for a whole variety of managerial topics.

In summary, specialized education is not for everyone. Smaller locksmith businesses, with the proper market niche, can easily survive without investing in this training. However, for the locksmiths who wish their businesses to become much larger companies, investing in business education is a necessity. Currently, only colleges and consultants offer viable training programs. However, in the future look for the larger wholesale distributors to provide more educational programs (possibly in conjunction with trade groups) as they recognize the growing need to be more involved in the educational process. ■



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